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INTELLIGENCE TESTS

In a competitive society, as it exists today, the measurement or rating of the Intelligence Quotient or IQ, as it is popularly known, is as important for the potential employer as for the career seeker. The need for a comprehensive yet simple book on this subject has been actually felt. Ajay Rai's book satisfies this need. It comprises fifteen tests covering various areas for measuring mental faculties. A lot has been said about the uses and abuses of Intelligence Tests. Still, they remain one of the most popular instruments of use in the measurement of Intelligence. Specialised institutions like the armed forces lean heavily on such tests for the selection of their officers.

Ajay Rai is a freelance journalist and author. His style combines the best in heady journalistic writing with the quiet sobriety of philosophical comment.

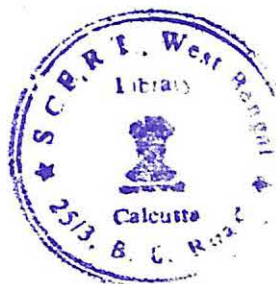
"...put on intellect."

William Blake

INTELLIGENCE TESTS

Ajay Rai

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Intelligence Tests

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PREFACE

Almost all educated persons are aware of the terms intelligence, Intelligence Tests and, specially Intelligence Quotient (IQ). To what extent they understand them is another matter. But, it is to the credit of Intelligence Tests that without a scientific base, and in spite of their shortcomings, they continue to serve their assigned role admirably well. Nearly all meaningful careers open their doors to the new entrant *only* if he has been successful in fulfilling the demands of the Intelligence Test.

Today 'Intelligence' and 'Intelligence Tests' are a part of the academic course wherever psychology is taught. Nearly all universities offer psychology as a subject for various levels of examinations, starting with Pre-University (PUC). However, there does not seem to be any book covering 'Intelligence' and 'Intelligence Tests' in their totality. Students have to sift the material from various books which can at times get very many (as well as time consuming). Although the present work is not a textbook, it is to fulfil the course requirement of these areas in under-graduate and post-graduate classes, that this book has been written. The book, however, is not meant *only* for students. It is also for those who do not *have to* study these subjects.

It is impossible to write a book like this in isolation. One has to study, apart from a horde of

sundry materials, books which give the basic knowledge of the subject. I owe this book to all those whose work made it possible and this galaxy of specialists includes, apart from giants like Binet, Simon, Terman, Piaget and Wechsler, people like Sir Cyril Burt, H.J. Eysenck; H.J. Butcher, Walter Bodmer, James C. Coleman, Lyle E. Bourne, Jr., Bruce R. Ekstrand, Luigi Luca Cavalli-Sforza, Anne Anastasi, J.W. Getzels, P.W. Jackson, M. Wallach, N. Kogan, Rick Heber and Howard Garber.

The 'Intelligence Testing' movement is still on. Many more developments are in the offing which, ultimately, will remove most of the shortcomings of Intelligence Tests. It will be my endeavour to keep pace with them.

Banasthali

Ajay Rai

Part One

Introduction

Nature of Intelligence

Intelligence has been defined as: intellect, understanding, sagacity, and rational behaviour. A more accurate definition would be:

“Intelligence is the ability of animals (which includes man) to adapt to changes in environmental condition through changes in behaviour.”

Before we go any further, it would be better if we, first, find out where we stand in the animal kingdom. Human-beings are *Homo Sapiens*. It is Latin and it means ‘the wise man.’ And the scientific definition of *Homo Sapiens* is:

“*Homo Sapiens* are members, with several extinct species, of the genus *Homo*, which belongs to the family *Hominidae*, the only family in superfamily *Hominidea* (anthropoids lacking a tail and cheek pouches), which is one of the three superfamilies in sub-order *Anthropodea* (primates having nails on all fingers and toes), in order *Primates* (mammals with nails on some fingers and toes), in subclass *Eutheria* (mammals with a placental connection between mother and unborn young) in class *Mammalia* (vertebrates with mammary glands and hairs), in subphylum *Vertebrate* (animals with a skull and vertebral column), in phylum *Chordata*

(animals with notochord, hollow dorsal nerve cord and other characteristics at some stage in development), in superphylum Coelometa (animals with a body cavity lined with peritoneum), in subkingdom Metazoa (multicellular animals with distinct tissues) in the kingdom Animalia."

In any species, intelligence reflects particular sensory (nerves that tell the brain about senses), motor (nerves that convey from brain instructions to every part of the body), and central nervous capacities, including the capacity for learning from previous experiences, as well as the hereditary organization of these capacities.

In other words, broadly defined, some degree of intelligence is found in all animals that show behaviour. For example, the protozoan *Stentor*, a simple, one-celled animal, reacts to a flood of inedible carmine particles, first by avoiding them, next by blowing them away with its many hair like cilia, and finally by contracting into its protective tube.

It is stimulated again when it emerges from the tube. It contracts at once. This shows the simplest process of adaptive or intelligent behaviour. That is, trying out a series of behaviour patterns and finally choosing one that is successfully effective.

More highly organized animals have evolved in the direction of increasing variability of response patterns plus the ability to shorten or eliminate trial and error.

The simplest intellectual capacity is that by association or conditioning. This can be measured by the number of trials it takes until a response is produced by the secondary or conditioned stimulus, plus the number of trials until the conditioned

response reaches stability. This is essentially a test of simple memory. It is quite difficult to measure the relative intelligence of different animal species, apart from differences in sensory and motor capacities, and to devise tests independent of these capacities. Animals are able to solve a variety of complex problems without using verbal symbols. In human beings, the capacity for language has been added to the capacity of non-verbal intelligence and so has created the possibility of conflict between the two.

The primary function of language is communication of learned material, so that each generation does not have to solve problems again and again. Language can also be used for the symbolic solution of problems, permitting a person to go through the process of trial and error in an abstract fashion. *It is the measurement of this symbolic solution which is the prime function of Intelligence Tests.*

In this recently evolved capacity, there are wide individual differences produced by the combined effect of heredity and environment. Since we will discuss them in detail in the relevant section, the following view of a specialist will in, the meantime, explain this phenomenon quite succinctly:

“(Individuals) show varying success in solving certain standardised problems. But it is not necessary to attribute this variation to differences in some cognitive factor. No problem can be solved by pure ‘intelligence’. A person has to know about the nature and qualities of all the things that he is dealing with, and such knowledge comes in large part from experience. Even apart from the advantages enjoyed by children in different cultural

groups, the extent to which an individual learns about his environment depends upon his curiosity, his eagerness to understand and his habits of cogitating upon his observations."

THE DEVELOPMENT OF INTELLIGENCE

"An animal is born with tendencies to react in certain ways to certain stimuli—tendencies based on inherited neural connections between sensory and motor systems. The animal's ability to learn is simply its ability to modify these connections (to break some and to form others) as needs and circumstances dictate. Differences in intelligence from species to species are differences only of degree. The higher animals can form more connections than the lower animals because of better sensory and motor development and because their nervous systems afford more elements for this purpose. Hence the evolution of intelligence merely entails refining old processes and replicating old neural equipment."

Of primary importance to us is the study of this 'refinement of old processes and replicating of old neural equipment' among the most 'brainy' species of the animal world—the *Homo Sapiens*, us, the human beings. And since "no reliable or accurately predictive estimates of future ability can be made before about two years (of age)" these first two years in the life of a human being become all the more important to us. What do we do in these first two years? How does our intellectual development take place? What effect these two years have in the subsequent development of our intelligence?

How do we develop intellectually? We are born with all the brain cells we will ever have. And we start losing them at an alarming rate (as many as 100,000 per day by the time we reach 60) from the moment we are born. And, unlike other body cells, these do not get replaced. Still, our intellectual development takes place. We keep on accumulating enormous amount of factual data and keep on reacting to innumerable interactions in ways which are equally diverse. How does this remarkable phenomenon take place?

Before we go any further, two points must be made clear. The first refers to the adequate availability of proper nutrition. As we all know, we are made-up of atoms which never stop moving. This movement results in the destruction of body cells which are replaced by newly built cells (excepting the brain cells). This destruction and construction requires energy (and raw material) to facilitate their proper functioning. This is where nutrition enters the picture. Absence of proper nutrition during infancy "not only impairs physical development and lowers resistance to disease, but also stunts brain growth and results in markedly lowered intelligence." It has been found that infants who died of malnutrition had brain cells 60 per cent less than that of normally healthy infants.

The other point refers to the environment in which the infant is brought up. An environment which allows a healthy, loving and proper parental care will develop a healthier child (with healthy intellectual growth) than the environment which has none of these requirements. And the importance of these two points is not confined to infancy only.

Since "the human being begins to experience the environment while still in the mother's uterus and the fetus (unborn child) may well be capable of rudimentary learning on the order of classical condition," they start playing their important role from the moment a child is conceived.

The apparent intellectual development in the human being begins from the day he is born. It is through this intellectual development that he is transformed from a bundle of energy, who is psychologically undeveloped and intellectually a non-entity (and who is capable of only 'startle reflexes'), into "an independent, knowledgeable and social human-being who has a capacity for originality and creativity in thought and action." This beautiful transformation takes place through the four basic constituents of intellectual development. A brief description of each one of them is given below:

- 1. Perception:** The senses develop to their full-scale within the first two years. Once this development is complete, the child can experience the world in the real sense of the word. He gets to know more and more about things he was already aware of, as well as adds knowledge about new things. This leads to still more experiences, which result in changes in his behaviour, which, in turn, teach him new ways to gather knowledge and distinguish between things of various types. Capabilities of efficient and systematic identification change with age. For example, "when an adult scans a book, he uses highly refined reading skills that the typical 3-year old does not possess... By the time the child reaches the age of 10 or 12, his perceptual skills,

including those involved in reading, are essentially mature and fully developed."

2. Learning: Contrary to the common belief, as we have found out, the process of learning begins from the day a child is born (there is even some evidence that learning takes place before birth). Beginning with the "classical conditioning of anticipatory sucking at the sight of a nipple," the process goes on and the child learns to distinguish between his parents, relatives, pets, etc. However, the abstract kind of learning does not come until the child is five or six years old, when he "develops an adult like command of the language (we will come to this later). This also seems to be the period during which the child develops an ability to talk and think for himself."

3. Cognition: The most important work in connection with the development of human knowledge has been done by the famous Swiss psychologist, Jean Piaget, who distinguishes four main periods or stages in which human knowledge develops. These are:

- "(1) The period of sensory-motor operations, extending from birth to 13 months or two years.
- (2) The period of preoperational representations, lasting until the age of about seven.
- (3) The period of concrete operations, extending to age 11 to 12.
- (4) The period of formal operations, beginning at 11 to 12 and typically complete at about 15."

The first stage involves six basic steps which result in the full development of sensory-motor operations.

- (1) The first month. The child remains unaware of objects around him.
- (2) Between the first and the fourth months. Development of coordination in the motor activity.
- (3) Between the fourth and the eighth months. The child endeavours to control and manipulate external objects.
- (4) Between the eighth and the twelfth months. The child begins thinking in terms of more 'instrumental activity.'
- (5) Between the twelfth and the eighteenth months. 'More systematic exploration of the environment.'
- (6) The last six months of the two-year period. Beginning of inferred thinking.

"The second main period, that of pre-operational representation... covers an enormous span of development, and in particular the child makes the great advance from mainly sensory-motor manipulation to the first manifestations of inner, symbolic, abstract representation."

The third period, that of concrete operation... involves three basic steps, resulting in concrete operation. These three steps are: compensation, reversibility and identity. For example, if a paper boat is converted back to the sheet of paper it was made-up of, compensation will teach the child that the size of the paper is balanced by its changed size, reversibility will teach him that the paper can be

changed back to the boat, and identity will tell him that in both the shapes the size of the paper remains the same. Arithmetic will teach him the same things in the following way:

$$6+4=10$$

$$4+6=10$$

$$4=10-6$$

$$6=10-4$$

The fourth period, that of formal operations... involves "systematic analysis, exploration and solution of problems." These manifest themselves when the child reaches his teens. A teenager approaches problems in a mature, logical and abstract way. He can even answer questions like: "Is Janta better than the Congress?" One of the most remarkable thing that happens during this period is the realization by the teenager that "thoughts are private and that no one else knows what he is thinking." And once this process begins, he starts cherishing close human relationships, other than those with his parents and relatives. The conflict of the right and the wrong also begins during this period.

Piaget has won world-wide acclaim for his enormous amount of work in this field. His admirers find him as great as the great Freud. And there are some who question his findings : "How far does the attainment of a stage depend upon stimulation, nationality, cultural and educational opportunity and so on? To what extent are the Piagetian measures 'culture-free' or culture-fair'?"

4. Languages: The importance of language can hardly be contested. No communication can be

possible without it. How does a child acquire it? "A child starts to speak intelligibly at about one year of age and goes on to master the fundamentals of language in about a 3-year span. By four years of age, the child has a vocabulary of well over a thousand words and can understand and produce most of the grammatical structure of his language."

Although not much is known about how this ability comes about, it has been found that development of inner speech (speaking with oneself) is directly connected with the processes of thoughts and influences many of our behaviours. Among children the inner speech and the outward speech are the same. This is why they talk to themselves when playing. This tendency wears off with age. However, adults do sometimes revert back to it when confronted with a difficult problem. Loud thinking is what it is known by.

It is during this period (when language is used) that "the child progresses from an egocentric to an objective view of the world and of causation. In this progress a kind of native 'realism', in which the child's immediate perceptions and individual perspective are assumed by him without question to give the one true picture is gradually superseded by an ability to discount or to stand outside these immediate impressions and to distinguish between the self and external reality. Complete objectivity is rarely or never reached, since there are 'adherences' surviving from earlier stages, but the development of intelligence is intimately connected with this increase in objectivity."

But, at what stage does intelligence stop developing? When does it reach the maximum development

No clear-cut answers exist. Even the role of intelligence and psychological tests is questioned as far as their ability to find out the answers to these questions is concerned.

HEREDITY AND INTELLIGENCE

Heredity plays a very important role in the ultimate shaping-up of (among other things) intelligence. This is one fact which almost everyone defends. However, although everyone does concede the point, the conflict lies only as far as the extent to which heredity influences intelligence. Scientists have found that the complex characteristic that intelligence is, it must be controlled by many genes "each contributing on the average a small effect," so much so that "extreme deviations from normal levels, as in cases of severe mental retardation can be attributed to single gene differences."

However, heredity is not the only factor having an important effect on the growth and development of intelligence. Closely following heredity is the other equally important (if not more so) factor, which affects the growth and development of intelligence, is a composite of factors known as 'environment'. "We can expect the characteristics to be even more strongly affected by the previous history of the individual and by a host of other external, nongenetic or in any case unrelated factors, which can together be called the 'environment'."

Since the study of twins facilitates the separation of genetic factors from the environmental factors, most of the studies (in this field) have been done on twins, of both the types (identical twins, which result from a single fertilized egg and, hence,

are genetically identical, and fraternal twins, which result from two separate fertilized eggs and, hence, are genetically different). Among identical twins differences, if any, can result only from environmental factors (because genetically they are identical) and their study can tell us the extent to which these differences can manifest themselves. But, among fraternal twins, differences can result from both genetic as well as environmental factors and their study can tell us the extent to which these differences manifest themselves as well as the relationship between these changes among identical and fraternal twins. It has been found that "whereas the contrast between identical and fraternal twin pairs minimizes genetic differences, it also tends to maximize environmental differences."

One such environmental difference is brought out by the study of adopted children, very specially identical twins, separated at birth and reared in different families. Although the environment given by the foster parents does have an effect, it is not as much as that which the biological parents give. In studies, in which similarities between foster parents and adopted children and biological parents and their children have been studied, it has been found that "the change of family environment does indeed have an effect, although it is not as great as that of biological inheritance. The correlation between foster parents and their adopted children is greater than zero, but it is undoubtedly less than that between biological parents and their offspring."

But, can such phenomenon really and truly be studied? Far from it. Complete study and analysis of

such facts and figures is almost impossible. Why? Because "adoption and rearing apart take place in conditions far from those of ideal experiments, and so any conclusions are bound to be only semiquantitative." However, even after making allowance for these limitations, the available data points to the influence of heredity on intelligence (as measured by IQ) very conclusively.

Depending on how 'high' and/or 'low' they are, the social classes have relevant 'high' and/or 'low' mean IQs. In his significant study (in which social classes were divided into six parts, starting with the 'highest' Class ONE, consisting of university teachers, etc., and ending with the 'lowest' Class SIX, consisting of semi-skilled and unskilled labourers, etc.). Sir Cyril Burt found many features, which remain unchanged for a long period, and which point to the fact that "IQ is itself a major determinant of occupational class and that it is to an appreciable extent inherited." Within a particular social set-up, there can exist sub-groups which remain reproductively isolated. In a comprehensive study of whites and blacks in the USA, Arthur Jensen found that the average IQ difference between blacks and whites is entirely genetic or mostly so. His logic runs as follows: Because the gene pools of whites and blacks are known to differ and "these genetic differences are manifested in virtually every anatomical, physiological and biochemical comparison one can make between representative samples of identifiable racial groups... there is no reason to suppose that the brain should be exempt from this generalization."

However, geneticists find his reasoning not all

that correct. As one geneticist says : "As geneticists we can state with certainty that there is no a priori reason why genes affecting IQ, which differ in the gene pools of blacks and whites, should be such that on the average whites have significantly more genes increasing IQ than blacks do. On the contrary one should expect, assuming no tendency for high-IQ genes to accumulate by selection in one race or the other, that the more polymorphic genes there are that affect IQ and that differ in frequency in blacks and whites, the less likely it is that there is an average genetic difference in IQ between the races."

We all know that the environmental variation in IQ is not confined to any particular race. Within a race, there can be high variations in the IQs because of the environmental influences individuals are subjected to. Although heritability of intelligence cannot be contested, the effect of environment can vary from '0' to as much as '100' per cent. Although they do cancel each other out or complement each other, the effect of environment is more varied than the effect of heredity. Some of the important effects of environment are:

- (1) Because parents sometimes cannot give complete attention to each of them, twins can have IQs different by 5 points, although heredity provides for almost identical IQs.
- (2) If people of a race are tested by their own people, they score 2 to 3 points higher than if they were tested by the people of so-called superior race.

- (3) Deficient diet during pregnancy can result in deficient children. If a particular class of society is poor and cannot afford proper food, its children will grow with brains which are not as healthy as they could have been. If, for example, there is a difference between the IQs of a 'lowly', poor Harijan and a 'high' caste, rich Brahmin (although no such, worthwhile research has been done on this relationship) it is more likely to be due to poverty than heredity.
- (4) Early childhood experiences have a lasting effect on the intellectual development of a person.

However, before much is based on the results shown by intelligence tests, caution must be exercised. As one specialist maintains, Intelligence Tests are at the most tests of achieved ability. No test, therefore, can be experience free. Whose experience? The person who is designing the test? Or the person who is being tested? If a high-caste Brahmin designs a test for a low-caste Harijan, it is bound to find the Harijan less intelligent than he really is. We will discuss this effect of social and cultural attitude in the relevant section. Here, it will be sufficient to say that the effect of heredity and culture (environment) are so interlinked that it is difficult to be certain about the relative contribution of each. "This limitation is confirmed by the dependence of all intelligence tests on the particular culture of the people they are designed to test. The transfer of tests to cultures different from the one for which they were designed is usually difficult, and sometimes

it is impossible. Attempts to design tests that are genuinely 'culture-free' have so far failed."

CREATIVITY AND INTELLIGENCE

It is not long before creativity was confused with a high degree of general intelligence. But much work has been done in the meantime and it has been found that creative abilities can be "usefully distinguished from general intelligence both conceptually and in terms of measurement or assessment." And as far as the definition of a creative person goes, the closest to the reality is the definition given by The American Association for Gifted Children. It says: "(The gifted individual is) a person whose performance in any line of socially useful endeavour is consistently superior. This definition includes those talented in art, music, drama, and mathematics, as well as those who possess mechanical and social skills and those with high abstract verbal intelligence."

Before we go any further, the confusion between originality and creativity needs to be removed. We require these abilities, for example, to answer questions like, "In how many ways can flowers be used for decoration?" The original response would be the one which is just infrequent. Nothing more. Nothing less. But a creative response would not only be original but also be relevant, practical or feasible in some ways. For example, "KAM $\frac{0}{0}$ GRRR + OINGP" could be a very original title for a book, but would hardly be creative. To be creative, it must express the spirit of the book. Moreover, in cases where original as well as creative

responses are involved, the number of original responses can far exceed creative responses. And, unlike original responses, creative responses need to be judged. What is more, as someone has said, "Creativity is the result of the production of a great many original ideas." Having made the distinction (between originality and creativity), let us now proceed with our discussion.

The relationship between creativity and intelligence has not been always as clear as it is now. For a long time, a person getting a high score in IQ was automatically considered a gifted (and, hence, creative) person. For all practical purposes, the term 'gifted' (individual) had become synonymous with the expression 'individual with a high IQ'. Luckily, this fallacy has been exposed, thanks to many investigations done in the field. One of the most quoted, discussed and interpreted such investigations was conducted by Getzel and Jackson. The children they studied had a mean IQ of 132 and most of them belonged to families of university lecturers. Only a very small percentage of children belonged to lower social classes (semi-skilled and unskilled). Two main groups of children were formed. One group had children who were very high on the IQ but comparatively low on creativity. The other group was very high on creativity but comparatively low on IQ. The results of this investigation were extremely interesting. Briefly, they were:

- (a) Although they had an average IQ 23 points lower than the 'high IQ' group, the 'high creativity' group performed equally good in

the academic achievements, proving that some of the factors responsible for creativity were equally effective as far as academic achievement was concerned.

- (b) Although they were doing more than was expected of them, 'the high creativity' group, was not preferred as much as the 'high IQ' group was preferred, by their teachers. It was suggested that 'the undervaluation of creative children by their teachers was partly accounted for by the less conformist values held by these children.'
- (c) The third difference lay in their attitude towards life. The 'high IQ' group wanted to have the same values that were needed for a successful life and the ones their teachers approved of. The 'high creativity' group, on the other hand, was not keen on having those values, although they agreed in general 'with the high IQ children both about the qualities making for success in adult life and the qualities in pupils that teachers approved of.'
- (d) The 'high creativity' group valued sense of humour much more than the 'high IQ' group did.

Another such investigation was conducted by the team of Wallach and Kogan. The groups formed by them included 'high creativity', 'high IQ', 'high creativity—high IQ', 'low creativity—low IQ', etc. The findings of this investigation conveyed clearly

the relationship between intelligence and creativity and were as follows:

"High creativity—high intelligence

These children can exercise within themselves both control and freedom, both adult-like and childlike kinds of behaviour.

"High creativity—low intelligence

These children are in angry conflict with themselves and with their school environment and are beset by feelings of unworthiness and inadequacy. In a stress-free context, however, they can blossom forth cognitively.

"Low creativity—high intelligence

These children can be described as 'addicted' to school achievement. Academic failure would be perceived by them as catastrophic so that they must continually strive for academic excellence in order to avoid the possibility of pain.

"Low creativity—low intelligence

Basically bewildered, these children engage in various defensive manoeuvres ranging from useful adaptations such as intensive social activity to regressions such as passivity or psychosomatic symptoms.

"From the findings obtained, it seems fair to conclude that the present definition of creativity denotes a mode of cognitive functioning that matters a great deal in the life of the child. Furthermore, consideration of the child's joint status with regard to the

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conventional concept of general intelligence and creativity as here defined is evidently of critical importance in the search for new knowledge concerning children's thinking."

The investigating team also concluded that 'the fathers of the high IQ group tended to be professional people in intellectual occupations, whereas those of the high creativity group were more often in business', with the result that the 'high IQ families tended to be very cautious and critical about themselves, their families and their children (every kind of risk to be avoided as much as possible) while the high creativity families tended to be more open, free and not critical of themselves, their families and their children (risks could be taken if they were worth it).'

However, the relationship between creativity and intelligence is not as clear as it should be. Not much is known. All conclusions, at best, are 'exploratory and provisional'. The process and sequence in which creativity grows has not been found yet. We do not, for example, know the answers to these questions:

In what ways home influences affect creativity?

How important is early training?

In what ways does criticism (and the tension it creates) from the teachers and parents affect?

Etc., Etc.

As we have found out, schools and school teachers remain the most well-known destroyers of

creativity. If creativity survives, it is not because of but in spite of schools and the environment they provide. Teachers have been known to become uneasy when confronted with the creative approach to a problem which the child finds and wants to use. In such cases, the child is either snubbed or criticised and, thus, unrepairable damage is done to him and his creativity. Parents, too, cannot escape the blame. In the caste-bound and sexually segregated society like ours, little boys and girls are told from their infancy about their respective roles in life and are repeatedly warned about the consequences should they decide to deviate from that role. How much damage is done to the intelligence and creative abilities by such 'ultimatums' is anybody's guess. No wonder then that such children, when they grow to become adults, tend to have a stunted growth as far as their creativity and intelligence are concerned. The effect of modernity (and the enormous potential it has in terms of growth and development), at best, confines itself to new clothes, fashion and other such things which, on their own, do not carry any meaning. But this is a long discussion and not very relevant to our subject. So, coming back to creativity and intelligence . . .

There seems to be a particular kind of personality trait(s)—closely connected with intelligence and creativity—which is very common among creative people. They "tend to display a stubborn intellectual autonomy and independence of judgement which makes them less willing than most to be influenced by group opinions and pressures."

This fact is amply proved by history, which is full of such kind of people.

Although not much research has been done to find out of what is creativity made of, whatever research has been done points out quite consistently that the factors which make up a creative person are: "Tendency to be more autonomous than others, more self-sufficient, more independent in judgement, more open to the irrational in themselves, more stable, more feminine in interests and characteristics, more dominant and self-assertive, more complex, more self-accepting, more resourceful and adventurous, more radical, more self-controlled, and possibly more emotionally sensitive, and more introvert but bold."

Because of its subject matter, investigations in the field of creativity and intelligence (and their relationship) hold very good promise for an extensive and varied research. Such a research is bound to benefit all, specially those who are intelligent. And creative.

INTELLIGENCE AND ENVIRONMENT

Although environmental influence includes home, parental, social and cultural influences, basically it has only two influences—social and cultural—which make up the whole fabric of environment and environmental influence. While discussing heredity and its effect on intelligence, we touched upon the role of environmental influences on intelligence to some extent, and found that the intelligence (and its development) of a person is affected to a very large extent. A recent research in the field brings out this fact most clearly.

When it was found that over 80 per cent of mentally retarded children had nothing wrong with their central nervous system, the inadequacy was mostly explained away as the work of defective genes. Some, however, found environment as the responsible factor. Two specialists, Rick Heber and Howard Garber, went to the city slum ("which typically is the section of any city with the highest concentration of the mentally retarded.") At first, they found that mothers who themselves were retarded tended to produce retarded children. They thought that "it was the way in which the retarded mothers dealt with their children that made the critical difference between them and the children of equally impoverished mothers of normal intelligence," they set out to prove their hypothesis.

They formed two groups, with 20 mothers and infants in each. The mothers belonging to one group were given training in child-care and house-keeping. Their children were subjected to over seven hours of looking after (feeding, bathing and teaching) by the 'infant stimulation teachers' each day. Nothing was done for the other group. After some years it was found that the 20 'stimulated' children were 'distinctly superior' to the youngsters who stayed at home. They had 'IQs averaging about 125, compared with scores of 75 or less for their mothers and about 95 for untreated children of similar background.' All because of the change in the environment.

However, this is, at best, an isolated case. Isolated, because the variations found both in environment and genotype are really phenomenal. What is true in one case and at one time may not

be true in another. As some specialists say: "The difficulty is that the realized IQ of given genotypes in different environments cannot be predicted in a simple way. A given genotype may develop better in one environment than in another, but this is not necessarily true for any other genotype. Even if it is true, the extent of the difference may not be the same. Ideally one would like to know the reaction of every genotype in each environment. Given the practically infinite variety of both environments and genotypes, this is clearly impossible. Moreover, in man there is no way of controlling the environment. Even if all environmental influences relevant to behavioural development were known, their statistical control by appropriate measurement and subsequent statistical analysis of the data would still be extremely difficult. It should therefore be emphasised that because estimates of heritability depend on the extent of environmental and genetic variation that prevails in the population examined at the time of analysis, they are not valid for other populations or for the same population at a different time."

Before we go any further, something about the importance of the study of environmental effect on intelligence. The intelligence of a person is affected by heredity and environment. We all know about it. While nothing much can be done about the heritability of intelligence, we can certainly do something about the environmental effect. And if something positive is done about it, the differences in IQs, due to environmental factors, would be minimized if not wiped out completely. And this can be achieved only by 'improving social conditions

and educational practice'. That even in a country like India which is a democracy and where everyone can have complete freedom, society is thoroughly divided economically and ethically, not allowing for equal opportunities to every individual is a fact which is at the base of most of the problems we are facing today. This state of affairs is existing because we are not fully aware of the effects of environment on the individuals. Whether we want to be aware of this depends, unfortunately, on the social class to which we belong. Obviously, the rich, high-caste class would not find it profitable to spread this awareness among the poor, low-caste class of the society. However, blaming everything on those who 'have' is extremely easy and highly fashionable. If the 'have nots' do not avail of the opportunities provided for by a free country like ours, and if, with the result, their environment remains as 'intelligence-killer' as it was a century before the fault is equally theirs.

Coming back to our discussion, we have found that environment plays an important role in the growth and development of the individual. We also know that "the crucial effect of environmental conditions is exercised between the ages of about one and four." What is not much known is that the effect of environment is not omnipotent and may not be permanent. Adverse effects of environments can and have been nullified and/or improved. Butcher narrates one such story of a mute mother (who could communicate only by crude gestures) and her daughter, who, until she was $6\frac{1}{2}$, 'had been permanently locked in a room alongwith her mother, with the result that, apart from total lack

of speech, (the child's) legs were so bowed that she could hardly walk.' Fortunately, their fate came to public knowledge and they were released. The child was hospitalised and within two years 'attained a normal degree of intelligence, communication and social adjustment.'

The way in which a person approaches a problem depends on the cultural environment to which he belongs. A non-competitive and secure environment would produce individuals who would not understand or be affected by the competitiveness and 'doing-things-in-a-hurry' approach of the individuals who belong to the highly competitive cultural environment. Even while living in the same culture, an individual can be deprived of its effect. This deprivation can be due to many reasons. The individual might have spent his childhood in poverty, isolation and/or without both/or either of his parents. Any of these deprivations can result in a highly affected intelligence (and personality). Isolation from one's own main culture can also change the very concept of the way in which intelligence can be handled and measured. In such cases, unless the test is designed by someone belonging to the same culture, little or no results can be expected. Consider the following example (adapted from an account by Pressey):

The examiner presents the problem: "If you went to the dhaba and bought six rupees worth of bread and gave the owner ten rupees, what change would you receive?"

One young examinee replied: "I never had ten rupees and if I had I wouldn't spend it for bread, and anyway bread is what my mother makes."

The examiner tried again: "If you had taken ten cows to pasture for your father and six of them strayed away, how many would you have left to drive home?"

The youngster replied: "We don't have ten cows, but if we did and I lost six, I wouldn't dare come home."

The examiner made one last attempt: "If there were ten children in a school and six of them were down with measles, how many would there be in school?"

The youngster replied promptly: "None, because the rest would be afraid of catching it too."

It will be clear from this example that, unless the questions are connected with the life or other such experiences of the individual, the test would be completely wasted. A native of Punjab, for example, cannot design a test for a Maharashtrian. Or a native of Bihar would find himself completely out of place in a test designed by a south Indian. The cultural and social differences have always to be kept in mind when a test is being designed. Otherwise, all effort can get wasted.

There also exists a close relationship between social classes and their intelligence. In an extensive study, Sir Cyril Burt found the following relationship:

Mean IQ of

(1) Higher professionals	139.1
Their children	120.8
(2) Lower professionals	130.6
Their children	114.7

(3) Clerical	115.9
Their children	107.8
(4) Skilled	108.2
Their children	104.6
(5) Semi-skilled	97.8
Their children	98.9
(6) Unskilled	84.9
Their children	92.6

Mean IQs of the wives correlated with their husband's. This distribution of IQs maintains itself because individuals with high IQs tend to rise whereas those with low IQs tend to fall.

In our over all study, we find that the role of environment and the effect it has on individuals and their intelligence is not only as important as the heritability of intelligence but can sometimes be more important. As Warburton says: "On every count give more weight to the environmentalist than to the genetic viewpoint of the nature of ability required in intelligence tests."

INTELLIGENCE QUOTIENT

Intelligence Quotient (IQ) is the ratio between Mental Age and Chronological Age, multiplied by hundred.

Mental Age is known as the child's ability to do successfully tests which the average child of a given age can do. For example, a child who solves problems which 50 per cent of nine-years olds can solve would have a mental age of 9, irrespective of his chronological age. If he himself happens to be of 9 years of age, he would be of average ability and have an IQ of, $(\frac{9}{9} \times 100)$, 100 as, by definition,

an average child has an IQ of 100. If, however, he happens to be 6 years old, he would have an IQ of, $(\frac{6}{6} \times 100)$ i.e., 150.

In case he is 12 years old, he would have an IQ of, $(\frac{6}{12} \times 100)$ i.e., 75. In this case he would be termed as mentally retarded, because 75 is less than the average IQ of 100. It has been estimated that only one in 200 children has an IQ of over 140 (or below 60). About 50 per cent of the children have an IQ of from 90 to 110.

Mentally defective are supposed to have an IQ below 70. We will discuss the two extremes (genius and mentally retarded) in the relevant section.

As we have found out, the IQ is not a measurement of innate capacity, because it is very much affected by cultural and emotional factors, as is academic success. Both are results of verbal skill, which is a learned and not an inherent ability.

When IQ is compared with academic achievements, results show great wastage of talents among academically and culturally deprived groups such as tribals, national minorities, scheduled castes and tribes, and children of economically backward parents.

In academically talented children, rule of progress is correlation and not compensation in abilities. For example, even in size, emotional stability, and creativity tend to correlate with verbal skills.

Just as the rate of physical growth varies from person to person, so does the rate of academic achievement. Those who go faster in their early stages are likely to go further in the long run.

THE GROWTH OF INTELLIGENCE TESTS

The birth and growth of Intelligence Tests (and the concept of IQ) has been a very checkered history. Why? Because today, despite attacks, IQ stands as a convenient though very rough instrument for predicting long range changes for academic success.

But this, however, is not the only reason. The concept of intelligence, and what it means in terms of various abilities, has been a very important subject of discussion among the experts. The idea of IQ was first introduced by William Stern, in 1912. Today Intelligence Tests and what they measure (IQ) has in recent years attracted more widespread attention, stimulated more study and research, and touched more closely the problems of social science than any aspect of academic psychology. Why only psychology, even the fields of education, psychiatry, industry and criminology are feeling the effect of the testing movement. Special testing laboratories have been organised. More and more complicated techniques, both statistical and experimental, have been elaborated. Problems as disparate as immigration and the hiring of aircraft engineers have been approached from the tester's point of view. This is the situation today. Was it always so? Hardly. Today, in spite of the exaggerated reception and the criticism these tests received in the beginning, they are still more widely used than before. If there is a difference it is only of this realisation that it is essential to give proper care in their interpretations.

However, this was not always so. Although

there were pioneers in this field before also (who, unfortunately, busied themselves mostly in discussing—whether or not intelligence can be measured), it remained for Binet and his collaboration with Simon to make the first important practical application, to introduce new methods of scoring and to combine, modify and organise the tests into the first scale of intelligence. Binet got the opportunity to put his ideas to work when the Ministry of Public Instruction in Paris (France) decided to distinguish between the school children, who were likely to have difficulty in school and could benefit from special programmes, and those who did not need this special treatment. Alfred Binet was a very famous psychologist at the time and he was commissioned to design a test which could make the desired distinction.

The first test appeared in 1905. It was the result of two basic assumptions which Binet (and his collaborator, Simon) made. The first assumption referred to the fact that intelligence is made up of various abilities. This assumption necessitated inclusion of a large number of test items which were of different kind. Although the team wanted to design a test which was completely free from the effects of a particular culture, they could not achieve their goal (we have already found out that a 'culture-free' Intelligence Test is an impossibility). The second assumption referred to the nature of intelligence, which, according to Binet and Simon, changes with age. This assumption necessitated gradation of the test items according to the age-group for which they were made. For example, a test item, incorporated in an Intelligence Test meant

for five-year olds, was (and is) not proper for the test, which is meant for fifteen-year olds.

Although they were designed mainly to test the judgement of the children, the tests included a wide variety of tasks involving memory, sensory discrimination, linguistic ability, understanding of abstract terms and other related abilities. Binet also introduced the concept of Mental Age. Since the concept of IQ was not existing at the time, Mental Age meant only the ability of a particular child to solve questions meant for a particular age group. For example, if a 7-year old child could solve problems meant for ten-year olds, the child will be said to have a mental age of 10 years.

The controversy (of whether intelligence could be measured at all) was still not over, and when the second Binet-Simon scale appeared in 1908, the authors were ready to answer the criticisms they had to face for their pioneering work. "Some psychologists affirm that intelligence can be measured; others declare that it is impossible to measure intelligence. But there are still others, better informed, who ignore these theoretical discussions and apply themselves to the actual solving of the problem . . . We have sometimes been accused of being opposed with blind infatuation to all theory and to the a priori method . . . What we strongly reject are theoretical discussions which are intended to take the place of an exploration of facts."

The second scale endeavoured to standardise the tests for different ages by assigning to each year level the tests passed by 75 per cent of the children of that age. They also endeavoured to measure

the intelligence of normal and sub-normal children. Even then they maintained that their scale was of greatest service in connection with children of inferior intelligence. Unfortunately, Binet died before anything more could be added to this phenomenal work. He could, alongwith Simon, only bring out a revision of his work (in 1911) before his death.

The next stage began with Terman's standard version of the Binet-Simon revision (which appeared in 1916). The concept of Intelligence Quotient had been introduced by then, and Terman adopted it, making it an inseparable part of the Intelligence Tests movement. It is this revision which became an extremely popular and important instrument in the world for the testing of intelligence, and was superseded only after Terman-Merrill revision made its appearance in 1937. With a slight change (made in 1960) this version is still in use today, and contains the following test items:

Year Five

- (1) Completes a drawing of a man with missing legs.
- (2) Folds a paper square twice to make a triangle, after demonstration by an examiner.
- (3) Defines two of the following three words: ball, hat, stove
- (4) Copies a square
- (5) Recognises similarities and differences between selected pictures.
- (6) Assembles two triangles to form a rectangle.

Year Twelve

- (1) Defines 14 words, such as haste, lecture, skill.
- (2) Sees the absurdity in such items as: "Bill Jones's feet are so big that he has to pull his trousers on over his head."
- (3) Understands the situation depicted in selected complex pictures
- (4) Repeats five digits backwards
- (5) Defines several abstract words, such as pity, curiosity
- (6) Supplies the missing word in several incomplete sentences, such as: "One cannot be a hero—but one can always be a man."

Equally popular are two other Intelligence Tests, designed by David Wechsler. One is the Wechsler Intelligence Scale for Children (WISC) and the other is the Wechsler Adult Intelligence Scale (WAIS). Unlike Binet-Simon scale, Wechsler's scales are combined into subscales to test different abilities (Binet-Simon scales were organised into age scales). These sub-scales are as follows:

The Wechsler Adult Intelligence Scale (WAIS)

- (1) General Information
- (2) General Comprehension
- (3) Arithmetical Reasoning
- (4) Digits forwards and backwards
- (5) Similarities

- (6) Vocabulary
- (7) Digit Symbol
- (8) Picture completion
- (9) Block design
- (10) Picture arrangement
- (11) Object assembly

The Wechsler Intelligence Scale for Children (WISC)

Covering the age range 5-16, it has ten basic subtests, the first five are "Verbal Scale" and the last five, "Performance":

- (1) General Information
- (2) General Comprehension
- (3) Arithmetic
- (4) Similarities
- (5) Vocabulary
- (6) Picture Completion
- (7) Picture Arrangement
- (8) Block Design
- (9) Object Assembly
- (10) Coding

In all these tests the most common factor is that they have to be given to one person at a time. What is more, they require a trained examiner for appropriate administration. In spite of this exclusive treatment given to the person who is being tested, his IQ tends to change if the same test is given to him twice. "It is not uncommon for a person to earn IQs that differ by as much as 10 points on

two different administrations of a test. This is unlikely to be due to a change in his abilities, particularly if the two examinations occur close together in time. More probably, the difference reflects some simpler change, such as variation in alertness on the two occasions, a possible practice effect, or something similar. What this means is that, if a person achieves an IQ of 110, there is a reasonable chance that his 'true' IQ lies between 105 and 115, or, if one wants to be more conservative, between 100 and 120."

This exclusivity of treatment tends to make these tests quite inefficient. Inefficient in the sense that, when large number of people have to be tested these tests become useless on practical grounds. The amount of time and resources becomes truly phenomenal, if only these tests have to be utilised. This became apparent when, during the World Wars, the army psychologists were faced with million of recruits who had to be tested, their cases evaluated and recommendations made. All in a very short time. They solved these problems by designing 'Army Alpha' and 'Army Beta' (which was a non-language test meant for illiterates and foreigners) tests. The momentum built during the wars kept up its motion and a wide variety of group tests of intelligence mushroomed. One of the side-effect of such tests was the availability of a mass of important data relating to apparently different groups—groups in different occupations, in different parts of the country, of different national origins, of different social levels, etc.

Even at that time, Binet had cautioned against the use of tests for purposes of comparison when

the environment and the background of the subjects differed. Another of his beliefs was proved when the specialists found that success in Intelligence Tests may depend on many factors, other than intelligence. Social factor, and more obviously, linguistic factor can make the validity of these tests quite insignificant. For example, the emphasis on speed in solving the questions may unduly handicap a rural testee. Cultural factors, too, come in the picture. A Hindu child can hardly be expected to understand that in religious places (like churches) "silence must prevail in churches and libraries," when his religious place is famous for its full-throated worship.

Does the general intelligence exist? According to the famous psychologist, Spearman, it does. He maintains that in the measurement of any ability there enter two independent factors. One is the 'General Factor,' the other is the 'Specific Factor,' which varies within one individual from one ability to another. Thorndike believes that individuals differ not in the kind or amount of any general mental energy but in the number of physiological connections in the central nervous system. The highest intellect differs from the lowest only in the capacity for having more of these connections. Thomson has suggested that the number of factors which enter into an activity like mental test are samples of all those which the individual possesses. Kelley, and more recently, Garrett, Brigham and others have come up with statistical evidence of a 'Multiple Factor' theory of intelligence, which says that a number of more or less general or group factors, such as linguistic ability, mechanical ability

and memory make their relatively independent contribution to 'General Intelligence.'

It has been found that the relationship between success at Intelligence Tests and success at academic study contains a lot of discrepancy. These discrepancies are bound to be there. Because academic success does not involve only intelligence, it is also dependent on the study habits, interests, motivations, persistence, emotional make-up, etc., of the person concerned. And all of these cannot be measured by an Intelligence Test. To find a solution to this inadequacy, attempts have been made to develop tests which measure non-intellectual traits like temperament, social intelligence, aggressiveness, sense of cooperation, etc. However, these tests have not reached the stage of standardization where they can be of any scientific use.

In conclusion, it may be said that Intelligence Tests have a definite though limited application. With all its defects it marks a definite improvement in the more or less haphazard subjective judgements of a child's intelligence which are often used in its stead. When used in combination with other criteria and in the hands of a careful examiner who is prepared to give due weightage to the qualitative aspects of the performance, it may be of real value in education, in psychiatry and in vocational guidance.

THE VALIDITY OF INTELLIGENCE TESTS

Having discussed the growth and nature of Intelligence Tests we now come to the validity of these tests. Validity in what sense? Validity in

the sense that whether the ability which these tests evaluate has any meaning when compared with the growth and development of all that intelligence results in. A lot has been said about the uses and abuses of Intelligence Tests. But, still, they remain one of the most popular instruments used in the measurement of intelligence. Our specialised institutions like the armed forces lean too much on such tests for the selection of their officer trainees. One reason for this practice can be the basic principles which have been borrowed from western countries, specially Britain. But, perhaps, this is besides the point. What concerns us most is the validity of these tests.

One of the most important researches, to find out the validity of Intelligence Tests, was done by the famous Lewis M. Terman (the research is still on), in the USA. The goal that Terman put before himself was 'to find out what are the physical, mental and personality traits that are characteristic of intellectually superior children, and what sort of adult does the typical gifted child become.' Terman had already made his name through the mass testing of American recruits with the Army Alpha tests in the first World War by the time he began his research, in 1921. About 1500 children out of a total school population of about two and half lakhs, were found whose IQs placed them at the top one per cent of the total population of that area. All these students had an IQ of 140 or above, the maximum IQ being of a girl (200).

An enormous amount of factual data was collected. Parents were asked to fill up a 12 page questionnaire, which asked, among other things,

development history, circumstances of birth, early feeding, age of walking and talking, illnesses, nervous symptoms, etc. Teachers were asked questions which were equally detailed. The selected students were thoroughly examined by the doctors with regards to their vision, hearing, nutrition, posture, teeth, lungs, neurological condition, etc. Next, 37 anthropometric measurements were taken and a three-hour long school achievement test was administered. To sum it up, character tests, interest blanks, list of books read by them in the last two months, and a home rating was taken. Though the boys exceeded the girls in the ratio of 115:100, Terman ruled out any bias in their selection.

When the research was started, these children were 11 years old, and, in the beginning only, Terman could demonstrate the general slight superiority of these children, even in those faculties which hardly had anything to do with intelligence. He found that "they had been rather heavier at birth than the average child, that they had learnt to walk earlier, had talked (on the average) about three months earlier, that they were, when tested, larger and heavier than the average of American children at that time, and that they matured physically at an earlier age. Their general health was found to be better than that of an unselected group, although it was admitted that this judgment was partly subjective. They were reported, by the age of 12, to sleep almost an hour longer than the average child. "These findings proved that there was not much truth in the commonly held assumption that intelligent children are supposed to be physically inferior to the less-intelligent ones.

(The reason given being that the excess intelligence is compensated by deficit physical condition).” Terman’s findings proved that the children who are intelligent are also physically superior to the average run of the mill children.

The progress these children made was at a much more accelerated pace than that of other children of the same age group. In fact, Terman found that the assessment by achievement tests ‘represented an acceleration of about 40 per cent.’ Even qualities like will power, perseverance, desire to excel, self-confidence, prudence, forethought; emotional qualities like humour, cheerfulness, optimism, permanence of moods; moral qualities like conscientiousness, truthfulness, sympathy, tenderness, generosity and unselfishness were found to be superior in the children who were being tested. During their final years in the school, these children constituted the top 10 per cent. This achievement becomes all the more remarkable when we consider that these children belonged to a younger age group than the average student of the same class.

More than 90 per cent of the boys and more than 80 per cent girls went to college. The significance of this fact becomes apparent when we consider the fact that, even in countries like Britain, this percentage is much lower (73 per cent for boys, 52 per cent for girls). In the follow up action after 25 years of the first test, it was found that the superiority, with which the research had begun, had maintained itself. And the data verified was authentic because, in this research, the most remarkable factor was the still active involvement of over 95 per cent

of all serving subjects. The superiorities included their physiology, too. The average gifted man was 5'—11' tall as compared to the average height of 5'—8" for the USA army-draftee. Gifted women were also taller than their counterparts among ungifted women, by more than 1". As Terman said, "The gifted group is probably at least equal or superior to the generality in respect to general health, height, weight, and freedom from serious defects."

Even the possibility of these people being insane was found to be lower than their average counter-parts. And, when they were affected by mental sickness, these gifted persons recovered much faster. Terman Said, "For all grades of mental maladjustments, there is a surprisingly large proportion of gifted subjects who have markedly improved or entirely recovered. It is suggested that superior intelligence may have been a factor in such improvement."

The IQ measurement, however, fell slightly (about 17 points). The main reasons were: (1) The error in measurement; (2) The failure of two intelligence tests used in the childhood and adulthood respectively, to measure exactly the same factors; (3) The maturational changes and environmental and educational influence. Terman commented on this subject with these words, "Probably the true net drop, beyond that due to error of measurement and failure to test the same function is somewhat between 5 to 10 points."

The professional achievements of this group were higher than the average. Unemployment was only 1 per cent as compared to 11 per cent of the total

population of that area. As far as their chosen professions were concerned, in the follow-up of 1955, when most of them were about 35, it was found that all of them had superior and better careers than those belonging to the same age group, but of lesser intelligence. Most of them were in the five best paid professions and were averaging over 15,000 dollars, which was much more than even by American standards. And... "the average earned income of all men in the group was just under 10,000 dollars. The 36 doctors were averaging 23,000 dollars and the six highest earners were from 100,000 to 400,000 dollars. Literacy and scientific achievement as assessed by volume of publication had also accelerated sharply. The group now had to its credit about 2,000 scientific papers and 230 patents, also 33 novels and many hundreds of shorter literacy productions." Terman concluded that, "the gifted men, both college graduates and non-graduates, were filling positions of respectability and exercising leadership to a reliably greater extent than the generality of college graduates."

Although final results have yet to come (as said earlier, the research is still on), Terman's research has proved, beyond a shadow of doubt, the validity of Intelligence Tests and the components of ability it tests. Considering that the tests available to him (in 1921) were, at best, relatively crude, the task which they have performed is really phenomenal. H.J. Eysenck has given a brilliant summing-up: "On the whole, this view of Terman's monumental work indicates that even the relatively crude tests available at the time of the First World War were remarkably successful in predict-

ing educational and occupational success. We may deduce that tests specifically constructed to predict later achievement rather than to measure present status would succeed even better in making predictions of this kind. This evidence is important.

"Many people attack intelligence tests as being playthings unconnected with things which we consider important in life. It would be difficult to sustain such an objection on theoretical grounds, but the best rebuttal, perhaps, lies in the quotation of results such as those summarized in the experiment. No instrument which enables us to predict future success as well as the old Binet Test did can be dismissed summarily as useless. We may admit that it falls short, very far short, of perfection and that much more work may need to be done to convert it into an instrument of accurate prediction."

"Nevertheless, at the present stage of development there is no known method of prediction which would improve on or indeed be anything like as good as a well constructed intelligence test administered by an expert psychologist, and interpreted in the light of all available psychological and statistical knowledge regarding prediction."

"The bright child, as diagnosed by the intelligence tests, apparently grows up to be the intelligent adult, and unless emotional instability maladjustment prevent it, it is the bright child who becomes the successful professional man or business executive."

TESTING AND ASSESSMENT

To be of any practical value, Intelligence Tests are always accompanied by a battery of other tests, which can broadly be put into two categories:

(1) Psychological Tests

(2) Sociological Tests

And they are also invariably accompanied by Medical Examination, which differ from purpose to purpose. For example, would be Air Force officers are very carefully examined for their vision and audition.

The psychological assessments are focused on the individual while sociological assessments are focused on the individual's life situations. The assessments are done through various methods. Before you start thinking about the validity of these assessments in relationship with Intelligence Tests, let me point out that success in Intelligence Tests depends to a large extent on the psychological and sociological make-up of the individual in addition to his intelligence. The best example of combined psychological and sociological assessment is an interview.

The reason why interviews are such a basic part of individual's assessment is the fact that since long people have believed that other persons can be sized up by "talking with them for a period of time." Ordinarily, an interview involves a face to face conversation between two persons, conducted in such a way that the person who is

interviewing can get information about the life-situation, behaviour and personality makeup of the person being interviewed.

Interviews can be simple or they can be difficult. In the latter case, questions are asked or tasks are assigned under specially created, stressful conditions to see how the person functions intellectually and emotionally under difficult circumstances. Every interview, like the individual it assesses, is or should be different.

However, in spite of their mass appeal, interviews, too, have their limitations. For example, nothing much can be ascertained in a meeting which does not last for long. Or the candidate, for example, can be too nervous and/or excited to be able to do justice to himself. Or, he may have so much of cultivated good behaviour that he may appear better than the best, much to everybody's regret later. There is also a tendency on the part of the person being interviewed to say what he thinks the interviewer wants to hear rather than what he actually thinks or feels. To eliminate this error, interviews can be carefully structured in terms of goals, contents to be explored, and the type of relationship the interviewer intends to establish with the person being interviewed.

Psychological Assessment

Psychological assessment endeavours to find out such characteristics of an individual as intellectual capacity, motive patterns, self concept, perception of the environment, role behaviours, values, level of anxiety or depression, coping patterns and general personality integration. Since these assessment tests

are far from perfect, it remains the task of the assessor to get what is needed from the facts he thus gathers. Intelligence Tests top the list of tests used in this kind of assessment. There are wide range of these tests to choose from. To measure the intellectual capacity of children, WECHSLER INTELLIGENCE SCALE FOR CHILDREN and STANFORD-BINET INTELLIGENCE SCALE are widely used. To measure adult intelligence, the most commonly used test is WECHSLER ADULT INTELLIGENCE SCALE. It consists of ten subtests, with one alternate subtest, of both verbal and performance material. Scores on the various subtests reveal the individual's present level of intellectual functioning. We will discuss Intelligence Tests in detail in the next section.

Personality Tests measure the parts of personality make-up of an individual, other than intellectual capacity. These tests can be easily grouped into Projective and Non-Projective Tests.

Projective tests depend on various "Irrelevant" stimuli, rather than definite questions and answers. The way an individual reacts to these "Irrelevant" stimuli, tells a lot about his conflicts, motives, intellectual level, coping techniques, and other aspects of his personality make-up. So, in a way, projective tests depend a lot on the reaction, and the result this reaction produces, of the individual to a particular stimulus, usually an INKBLOT. Of the many tests of this kind, the most common ones are:

1. Rorschach Tests
2. Thematic Apperception Tests (TAT), and
3. Sentence Completion Tests.

The Rorschach Tests were conceived by the Swiss psychotherapist Hermann Rorschach, who first used the inkblot as an instrument to assess personality, in 1911. This test utilises inkblot pictures, like the one below, and the person being tested is introduced to them and is asked to tell what he sees, thinks, and what the blot means to him:

An Inkblot



As per change in environment, times, and culture, responses to the same inkblot differ from time to time.

The Thematic Apperception Test (TAT) was first tried out by Morgan and Murray of the Harvard Psychological Clinic, in 1935. In this, a series

of simple pictures are utilised, and the person being tested is asked to make up a story, based on each of the pictures. Since the pictures do not say anything on their own, the story thus written shows nothing but the inner psychology of the person being tested. A sample photograph is given below:



The Sentence Completion Test, once again, does not say anything on its own. It simply lets the person being tested put down his inner conflicts, worries, and his inner personality make-up. The sentences can be given as follows:

1. A man.....
2. I wish.....
3. Mother.....

4. I love.....
5. Women.....

Anything which completes the sentence will be the direct index of the inner subconscious of the person being tested.

Non-Projective Tests are quite different than the Projective Tests.

In these tests, questionnaires, self-inventory or rating scale technique of measurement is used. One of the most common non-projective tests is the Minnesota Multiphasic Personality Inventory, which was developed by Hathaway and Mckinley in 1943. It has statements like:

1. Persons with serious hereditary defects and diseases should be compulsorily sterilized.
2. Divorce laws should be altered to make divorce easier.
3. The so-called underdog deserves little sympathy or help from successful people.

By agreeing or disagreeing to these statements, the person will portray his "Political Personality" to the analyser.

There are two other non-projective tests, which do the same work, but with a different point of view. These tests are used to find out the subject's abilities, interests, aptitudes, temperaments, anxiety level, self concept, and other parts of his personality make up. Among those in common use are Sixteen Personality Factor Questionnaires, the Kuder Preference Records, and the Kahn Test of Symbol Arrangement.

Group Assessment

This has special reference to the would-be officer's selection for the armed forces and the allied services of the Centre. Every individual is carefully examined as per his relationship with other members of the group, which is being assessed by the Group Testing Officer (GTO). While doing the assessment, it is imperative for the GTO to prepare himself by answering the following questions:

1. What are the structural and organisational characteristics of the group, like social roles available and enacted by the group members, communication pattern in the group, power relationship in the group, norms and values of the group, resources and goals, number and characteristics of the group members?
2. What are the functional and task performance characteristics of the group like playing of roles in the group, the actual functioning of communication processes, the handling of conflicts among group members, the decision-making processes of the group, the ways in which the group develops and uses its resources, and the performances of the group in achieving group goals and meeting the needs of the group members?

Final Assessment

Once the battery of tests is completed, the time comes for the final analysis. It is actually done by

the joint meeting attended by the various testing specialists, who are concerned with the individual assessment of the people being assessed. It is on the basis of this assessment that the final judgement is passed.

Having completed our brief survey of the testing methods, we will, now, come to the detailed description of Intelligence Tests.

INTELLIGENCE TESTS

Basically, each of the Intelligence Tests endeavours to test some primary mental ability of the person taking the tests. These primary abilities are:

1. Verbal Abilities.
2. Verbal Fluency.
3. Numerical Abilities.
4. Spatial Abilities.
5. Perceptual Abilities.
6. Memory.
7. Inductive Reasoning.

Let us take them one by one.

1. Verbal Ability

Questions on verbal abilities seek to find out to what extent one understands what one reads. These are mainly of three kinds:

(a) *Proverb Test*: It endeavours to test your knowledge of the proverbs. In this test, a proverb is given and is accompanied by a few (usually 4 to 6) other proverbs, some of which mean nearly the same as the original proverb. And you are asked to choose the correct one.

(b) *Verbal Classification:* In verbal classification, usually three classified lists of different words are given. The first two are truly classified. They refer to two particular kinds of words. For example, the first list may have names of countries, the second may have names of fruits. But the third list is a mixed list. It will have names of both countries as well as fruits. What the subject has to do is to put number "1" against the name of that country which lies in list "3" (because countries are belonging to list "1"), and number "2", if the name happens to be that of a fruit (because fruits are belonging to list "2"), and so on.

(c) *Verbal Relation:* In verbal relation questions, the subject is asked to connect two connecting words. There are about 10 words. One of them is "hair", also somewhere in the list is a word "head." Since hair grow on head, the subject will write the number of the place where "head" lies in the list. For example:

1. Nail
2. Finger
3. Hair
4. Teeth
5. Palm
6. Work
7. Chair
8. Head

The number filling the blank will be "8"

2. Verbal Fluency

Questions on verbal fluency test your ability to

recognise words, not given in their proper order. These questions are of three kinds:

(a) *In the first kind* one is given words in a disarranged form and has to rearrange them in their proper form. Like:

- | | |
|------------|---------|
| 1. NESES | SENSE |
| 2. GPI | PIG |
| 3. HAARMLI | ALMIRAH |

(b) *In the second kind*, you are given two letters, and are asked to find out words which begin with the first letter and end with the second letter. For example:

- Q. Write three words that begin with "N" and end with "L."
- A. a. Null
b. Nobel
c. Novel

(c) *In the third kind*, you are given a comparatively longer word, and are asked to make out as many words as you can, using only those letters that are given in the original word. For example:

- Q. Make out as many words as you can by using the letters of the word "GENERATION."
- A. 1. Nation
2. Ration
3. Art
4. Era
5. Snore
6. Gene

7. Rat, etc.

3. Numerical Ability

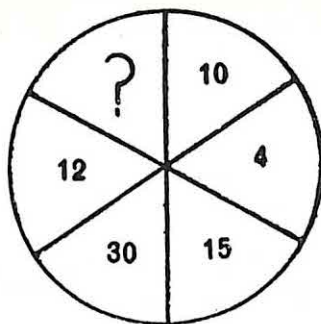
Questions on numerical ability endeavour to find out about your familiarity with numbers and their behaviours. These questions can be of many kinds. They might be simple mathematical puzzles or they might be difficult problems. For example:

Q. Fill in the blanks:

4,6,8,10,...

Here, the answer would be 12, because there is a regular interval of 2 numbers between any two numbers of the series. This is a very simple example. Questions tend to become more and more difficult as the test proceeds.

Q. Fill in the blank:



Here, the answer would be 45, because numbers on the left hand side of the circle are three times their opposite number on the right hand side.

Q. Fill in the blank:

15 (30) 45

10 () 66.

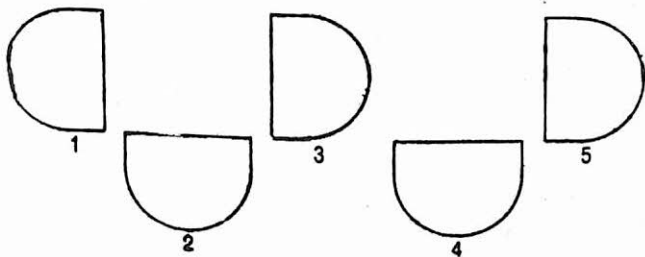
The answer will be 56. Because the number inside the bracket is the difference between the numbers outside the bracket.

These examples will give some idea about the very diverse nature of these questions. But, in spite of all this diversifications, the answers are always found in the question itself.

4. Spatial Ability

Questions on spatial ability endeavour to find out the extent to which your vision is ruled by your intelligence. Usually a chart of illustration is given, and you are asked questions based on that chart. For example, there can be questions like:

Find out the odd-man-out:



Here, the answer would be the third figure because the rest two pairs can be rotated into each other.

5. Perceptual Ability

Questions based on the perceptual ability endeavour to find out your power to choose identical things in a mass of collection of similar data or figures,

6. Inductive Reasoning

Inductive reasoning tells us that what is true in one case will be true in all other such cases. Questions on this will test your inductive reasoning. For example, there could be questions like:

Fill in the blank:

- (a) axbyaxbyaxbyaxb—
- (b) srtrurvrwr—

In the first series, the answer will be “y,” because in the first places “axby” is repeated, so it must be repeated the third time also.

In the second series, the letters are proceeding in their alphabetical order, but always interrupted by “r,” so the letter filling the blank would be “x.”

A third type of question would be:

Find the odd-man-out:

ABBC	DEEF	IJJK	XYZA
1	2	3	4

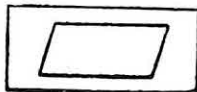
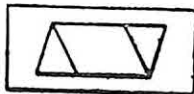
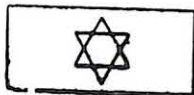
The fourth group would be the odd-man-out, because the remaining three groups have one thing in common. They are in their alphabetical order, the middle letter being repeated.

7. Memory

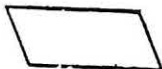


In questions, testing your memory, you are

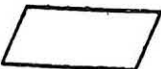


given some facts, and then are asked to memorise them within a given time, after which you are asked questions based on that. For example, there can be questions like:

Study the following figures:



In the list given below mark out the figures that are listed above:

	x
	✓
	x

	✓
	x
	✓

Normally, memory facts are given on a separate sheet and they are tested on another. While going through this section, it must have been quite evident that the examples taken are quite simple ones. It has been deliberately done so. In the test proper, they will be to relatively more complexity.

BASIC PRINCIPLES INVOLVED IN THE CONSTRUCTION OF TESTS

The purpose of any test is to measure. Through Intelligence Tests we endeavour to measure intelligence. But can intelligence really be measured? Can we measure something which is just an ability without any shape, size or any other dimension. When, even physical measurement of things (like a yard of cloth) is full of scientific complications, can we really measure a factor like intelligence? And the argument goes on and on. And while cynics are busy arguing, the experts keep up their work and we get the kind of tests we want. The experts do not resort to any magic. They just follow the other side of the argument and realise that things which cannot be measured can still be put to degrees of measurement in which an imaginary number can be the base and the rest can be measured on the basis of numerical values they are given. Still, the main objections to psychological measurements are as follows:

(1) Intelligence, personality and aptitude are very complicated concepts and they incorporate very many factors, involving skills of the most specialised kind. To what extent is it possible to measure them on the basis of low-grade problems with a complicated set of numerical scores?

(2) The scoring is highly uneven and unstable. For example, the same person will score differently in the same test if asked to do it at two different times. Moreover, people are not equally intelligent all the time. Their intelligence tends to get affected

by irrelevant circumstances, too. Under these circumstances the very stability of the test becomes suspect.

(3) The last objection is in connection with the actual measurement of the score itself. It sounds surprising, but we do not have any basic methodology for measuring such scores. In fact, there cannot be any such thing. So, under these circumstances, the very scoring problem becomes suspect.

In a nutshell, these objections refer to the measurement, reliability and validity of the test concerned. Before we start discussing these three objections, let us, first, take principles of test construction.

Principles of Test Construction

Like everything else, when constructing a test, the first step is to define and work out the *PURPOSE AND SCOPE* of the test. This is very important in case psychological tests are to be designed. For example, in a test designed to tell the present general aptitude of a person, questions about future special aptitudes would be quite irrelevant and would harm the whole interpretation. However, these are not the only purposes for which tests are designed. They may be designed, for example, to find out the weaknesses of a personality so that corrective steps can be taken.

The second step is to clearly know and define the kind of test items the test constructor wants to put into the test. Is he going to lean more on mathematical reasoning or verbal fluency? The way questions are put also depends on the people for whom the test is being designed. Most often, the test

constructors study, interpret and analyse available tests and other relevant reference banks, before embarking on the construction work of his own test. If, however, he is designing an entirely new test for an entirely new purpose, he is well advised to take the help of his colleagues and have an abundance of various types of items to choose from. This will allow him to choose only what is best for his purpose.

At first, the test constructor might face the problem of how to test the face validity of the test items at his disposal. When and if he has a big bank of items, he will find that some items are more or less valid than the others. Depending upon his requirement he can, then, choose only what he finds as the best item for the purpose. Since he will have to sift his test many times before reaching the final form, he should still have more items than he needs.

Before making the final draft of the test, the test constructor will have to undergo many trial tests to see how the tests perform. For the trial test, it is imperative that the people to whom the test is given should be representative of the people for whom the test is made in the first place. For example, if the test is meant for the age group of 10-15, the sample of people to whom the test is administered on a trial basis should also belong to the same age group and not to any other one. Depending on the nature of the test, many sample administrations are administered before the final draft is ready.

This trial is extremely useful in sifting out the

ineffective or useless test items. For example, a question which no 10-year old can answer and every 12-year old can is apparently best suited for a test which is meant for 11-year olds, and not for any other age group.

The final form of the test having being reached, the process of test measurement comes in the picture to facilitate the standardization of the test. In the field of psychological testing there are mainly four scales of measurement which are utilised for the purpose. In nominal scale a very elementary separation of items is made (birds-animals, male-female). The second scale is called ordinal scale, and involves ranking of items according to a particular methodology (for example, the construction of a merit list). The third scale is called the interval scale and it involves comparisons between the differences of equal size between units (for example, how many centimetres make an inch). The fifth scale is called the absolute scale, in which "numbers have already been ascribed to all the magnitudes. Such are the ratios themselves on the ratio scale; also, the results of counting objects, events and the like. An important example of quantities measured on the absolute scale are probabilities. Probabilities are absolute numbers, because they are not measured in special units." Depending on the requirement, any of these four measurements can be utilised to make standardization possible (of the test).

After having reached the stage of standardization of the test, a rigorous check is made to prove the reliability and validity of the test. Test reliability

involves 'consistency' and 'stability' of test measurement. Consistency refers to the balance in the test in terms of similarity and inter-correlation of test items with each other. Stability, on the other hand, refers to the permanency of the test's consistency in giving proper results in successive administrations. It has been found that tests which have high consistency are highly stable, too. Test reliability can be known through many ways. The degree of reliability reached by giving the same test twice to same people is done through test-retest method. In the alternate form method, there are two tests for the same purpose and the way the subjects react to them gives the degree of reliability and can then result in transfer of some items from one test to the other. In the split-half method, the same test is broken up in two halves and the resulting two sets of score are correlated. "The best known tests of intelligence have reliability coefficients of 90 and above, which are extraordinarily high correlations. Such a high correlation indicates that a person is very likely to score approximately the same every time he takes the test." To what extent this observation holds good depends from test to test and from purpose to purpose for which the test is designed.

The difference between reliability and validity is more or less the same as that between 'consistency' and 'stability'. While reliability refers to the accuracy of the test as far as its contents are concerned, validity refers to the extent to which the test is fulfilling its purpose. There are mainly five ways to test the validity of a test. The face validity

refers to the over all appearance of the test. If, by just glancing at the test, some discrepancies are evident, these will affect the validity of the test. For example, if the test is for 15-year old and has questions which even a 5-year old can answer, then the validity of such a test will be decreased to a very large extent.

Test validity can also be known by comparing the new tests with existing tests which are being used for the same purpose. For example, the test constructor might like to know how a group of people will perform in his test. The same group of people can also be given a standard test like Binet's. Their performance (in terms of IQs they have earned) can then be compared. If the correlation is high then the test constructor can conclude that his test is, at least, as purposeful as the Binet's test.

If a test is constructed to choose candidates for a specific course (or purpose), its validity will lie in the degree of success those candidates achieve in future. For example, if a test chooses candidates for a management course and the candidates prove themselves highly successful in the field, it will be proof enough that the test is highly valid for the purpose for which it is constructed. This is known as predictive validity.

Construct validity is a measure "of the extent to which a test actually represents the intended construct, such as intelligence. It is the most important kind and the most difficult to establish; the most important because it is, at least in principle, free from the arbitrariness that applies to the other types, and because it is closest in conception

to the intuitive idea of validity as the degree to which the test fulfils its purpose." One of the main reasons why construct validity is the best is that it is a matter of logical analysis and not correlation.

The degree of validity spells out the effectiveness of a test. The quality and usefulness of a test is directly connected with the validity it can command. But, like everything else, too much of dependence can destroy the potentials of a test. As a specialist says: "A test with low validity is often better than none at all, especially in a new research area."

NATURE OF INTELLIGENCE TESTS

It will be proper to say in the very beginning that the Intelligence Tests and the concept of Intelligence Quotient have so scientific basis. But, still, they are very popular. The reasons are both historic as well as personal.

When, at the beginning of this century, these tests were designed and executed, they had had tremendous amount of success. With the effect that "quack" psychologists had the whole field at their disposal. It was because of these "quacks" that the Intelligence Testing movement saw the nadir of its fame; that it rose from that nadir is because of many reasons.

Every human being's first concern is his own personality, intelligence, frustrations, sorrows, and happinesses, etc. This is the main reason (which is quite personal) why Intelligence Tests are so popular.

Before we proceed with our discussions, we

might as well make one point very clear. The relationship between Intelligence Tests and Intelligence Quotients (IQ) is a very close one. In fact, one is because of the other. The existence of Intelligence Tests is mainly to calculate IQ, which is calculated on the basis of one's performance in the test. So, in a way, it is the IQ which is our main responsibility in this section.

It has been considered by the specialists that:

1. Only 0.5 per cent of the population has an IQ of 140 or above.
2. About 3 per cent have an IQ of between 130-140.
3. About 7 per cent have between 120-130.
4. About 14.5 per cent have between 110-120.
5. About 50 per cent have 90-110.
6. About 25 per cent have between 0-90.
7. Persons with an IQ of 52 to 68 are said to be mildly mentally retarded.
8. Persons with an IQ of 36 to 51 are said to be moderately mentally retarded.
9. Persons with an IQ of 20 to 35 are said to be severely mentally retarded.
10. Any person having an IQ of below 20 is said to be profoundly mentally retarded.

But the criterion to judge the mental health of a person on the basis of IQ is not a very valid one. It is so because of many reasons.

First, of course, is the degree of permanency of having the same IQ for long. What IQ is had in

the childhood will not be the same when the person grows up. What is more, if the IQ is calculated when the person was very young, it will have little or no validity. There really is no age at which IQ's are to be taken seriously.

Second, of course, is the very validity of IQ. It is only the lack of better methods that Intelligence Tests are utilised to know about a person's intelligence. But, to counter this argument, we have the fact that persons with higher IQ, will, in most probability, succeed better in intellectual tasks. It has also been found that to get a first class degree, or some equivalent distinction, a student would probably have to have an IQ of 135 to 140 at the very minimum.

This fact prompts me to raise a point. In our universities, the basis of admission to all the courses is either percentage of marks received in the previous examination, or a very plain passing. This practice has created several, multi-faceted problems, not to speak of mammoth unemployment. If only we could make intelligence the pre-requisite to admissions, it will solve a lot of problems. Only those students will be admitted who have a relatively better ability to do the course. A lot of potential misfits and dropouts will be sifted. This will increase the validity of the course and the university, and the end product will be a lot better. At present it is done only in specialised courses in institutions like IIM, IIT, etc. And the quality as well as number of successful graduates is very flattering. This becomes more valid when we consider this point. It has been found that those

students who get first division in their examinations have an IQ of 10 points more than those students who get lower divisions. And those who fail in their examination have an IQ of 15 points lower than those who pass the examination.

Having made our point, we will now, come to the relationship between IQ and success in life. It is true that persons with low IQ are misfits and quite unsuccessful in the academic field and intellectual pursuits. This is because we need intelligence to succeed in any field. Lack of intelligence cannot be compensated by anything else.

But, then, is the phenomenon of having a lower intelligence such a drawback that it cannot be cured? Does it make the person having lower intellect totally helpless and beyond any remedy, and condemned for ever ?

Far from it. Though it is true that intelligence is decided by the genes. In other words intelligence is hereditary. So much so that it is better to test the parent of a six-year old child, to know his IQ. But this hereditary factor is effective only in the early years. Later, it disappears. Then, it is the environment and other such factors which dictate the amount of intelligence a person will have. But this, too is not enough. Success at Intelligence Tests depends not only on intelligence but on many other factors like motivation, background training, set of questions, experience, and knowledge. Take the question of speed, for instance. Every Intelligence Test is to be completed within a prescribed time limit. Which is, normally, too short for all questions to be completed. Now,

this need of speed may be a very familiar thing for a metropolitan city dweller who takes his day with the speed that will easily make a country dweller go crazy. What is more, he would not understand the need for speed which so many of us city folks take for granted. If these two persons are ever tested together for the measurement of their IQ, the city dweller will win the race hands down. This is one reason why country dwellers make-up such a large chunk of unsuccessful candidates in any sort of competition. The only solution to this is to spread out the "gospel" of Intelligence Tests and IQ as far and as wide as is possible. Because the concept of IQ is here to stay, and is responsible for all sorts of changes in the testing medium. This is one factor which determines the success of a person in the Intelligence Tests. The other factors are equally important.

We must also discuss something about the way in which questions in the Intelligence Tests are to be answered. To illustrate my point, I have many times taken the help of the following story. It performs its work supremely well.

It seems that there was a missionary, who was caught by a fierce tribe in the jungles of...

Never mind that. It does not much matter.

There was nothing remarkable in this. There were many missionaries who were caught by many tribes (which were, sometimes, fierce). The catch, here, was this.

This particular tribe was a cannibalistic one. Having special liking for flesh covered with white skin. But the chieftain was a just man. He said:

"You are going to die. But since you have done good work we will let you choose your way of death. I will allow you to make a statement.

"If your statement is true, then you will be roasted alive. But if it is false, you will be cut into pieces."

Now. There was nothing very "poor" about this missionary. He was highly intelligent.

He knew that the chieftain will honour his words. Come hell or high waters.

So he made a statement. He said:

But before I tell you what he said, what do YOU think he said. Your answer will spell out the way the questions in an Intelligence Tests should be answered. He could have said. "God Is!" and the matter would have ended right there and then. Or he could have said any of the zillion facts he knew about the jungles. There are many possibilities. But, every answer would have, ultimately, killed him. That is, all but one. And it was:

"I will be cut into pieces."

This put the chieftain in a fix. And kept him there. Because, if he cut the missionary into pieces, the statement would prove to be true. In that case, he ought to be roasted alive. And, if he is roasted alive, the statement would be false. In that case he ought to be cut into pieces. That would make the statement true and he ought to be...

The legend has it that the descendants of that chieftain are still trying to find the solution to their predicament.

Incidentally, the missionary lived to a ripe old age, and died a natural death. This may not have

happened. But it proves what it intends to prove. It proves that the missionary's answer utilised only the facts presented. No more. No less. He knew the chieftain would honour his words. He also knew that his concept of God, or love, or anything may or may not suit the chieftain. That would have given a very sad ending to our story. Because, the missionary wanted to live (who doesn't!) His answer is a classic example of the way Intelligence Test questions should be answered.

In a nutshell, answers to Intelligence Tests should always be as much based on the facts given in the questions as is possible. No more no less. That kind of answers will fetch you maximum score.

THE TWO EXTREMES

The average is always found on the basis of the lowest and the highest. In intelligence, these two extremes would be the mentally retarded and the genius. It will serve our purpose well if we conclude our study with a brief description of these two.

Mentally Retarded

Mental retardation has been defined as: "Significantly subaverage general intellectual functioning—existing concurrently with deficit in adaptive behaviour, and manifested during the development period."

This phenomenon occurs in children throughout the world. Its incidence increases markedly at the age of 5 and 6 years, reaching its peak at 15, and drops off shortly after that. There are four main levels of mental retardations:

(1) Among the mentally retarded, the largest number of persons belong to the Mild Mental Retardation Group. These persons have IQs ranging from 52 to 68, and can be educated. An adult mildly retarded person will have intelligence equivalent to that of a child of 8 to 11 years of age.

(2) Next are the Moderately Retarded. They have IQs ranging from 36 to 52. And adult of this level will have intelligence equivalent to that of a child of 4 to 7 years. They can be trained.

(3) To the third level of mental retardation belong those falling under the category of Severely Mentally Retarded. They have IQ ranging from 20 to 35. They are, what is commonly known as the dependant retarded. Although they can be taught limited levels of personal hygiene and self help skills, they remain dependant throughout their lives.

(4) Fourth, and last, level of mental retardation is that of Profoundly Mentally Retarded. They have IQ which is below 20. These persons need custodial care throughout their life, which, due to deterioration in health and resistance to diseases, is quite short.

Before this matter is treated with seriousness, it should be remembered that announcing a person to be mentally retarded on the basis of IQ is not very desirable. There are many slips between the cup and the lip, so it has been said, and there are a lot of things that go wrong in the administration of Intelligence Tests and correct calculation and interpretation of the IQ, as the following story proves:

"It is all too common for school systems to

administer IQ tests and then confine the low scorers to 'special' classes for the mentally retarded or emotionally disturbed. In San Diego (the USA), attorneys representing 20 black and Mexican-American student plaintiffs argued that the city's Unified School System had no right to make such placements on the basis of standard IQ tests designed for white middle-class students. Retesting by an outside psychologist indicated that all but two of the children were actually of at least average intelligence and the exceptions were borderline cases'!

The other factors have been properly raised by J. Wortis (as quoted by Coleman): "An IQ score, at best, can indicate where an individual stands in intellectual performance compared to others. What others? His nation? His social class? His ethnical group?

"No Intelligence Test that has ever been devised can surmount all of these complicating considerations, and claim universal validity."

Genius: A Case History

"Maths agrees with me. It is very precise. I don't think I could ever accept anything that wasn't reasonable. I have just read a chapter of Whitehead and Russell's *Principia Mathematica*, which deals with the logical development of logic. Do you think that sounds redundant? Well, it isn't ...there could be an illogical development of logic. During the 19th century revolution in mathematics Boole, and later, Russell and Whitehead put logic on a firm basis.

"Euclidean geometry is very imprecise and

illogical. Euclid makes assumptions and says things that in the long run just don't make sense. Hilbert revolutionised this. He combined the work of Euclid and Descartes, who made geometry an extension of algebra. There are three schools of logic. Hilbert did a lot for calculus, and analysis and number theory. If I use a mild example, you take these two spoons. You have to define what distance is. The distance between these two spoons, you see, is a function."

The speaker must be a mathematics professor extraordinary.

Right?

Wrong.

He is an eleven-year old boy called Mike Gross.

Jane Howard says in her article (published in LIFE):

"Mike's mind, if modern radar techniques for discovering human potentials are to be trusted, is one of the most spectacularly productive in the history of human race."

Mike's IQ was so far above the 200 mark that it could not be calculated with any meaning. His academic feats were equally staggering. After joining Michigan State University at the age of eleven, he earned all A's, and without ever having taken any chemistry or physics, he was placed 9th out of 340 participants in a test given to all students in the college's natural science course.

A year earlier, he had decided to enter a junior science exposition and for his project invented a whole new theorem—an original mathematical formula applied to genetics which measured the

predictability of hereditary traits under certain conditions. In the computer coding course he took at MSU, he did so well that he was offered a job at the university's Computer Centre.

However, Mike's is not the only case. American universities like John Hopkins' have regular programmes for child geniuses like Mike Gross. This programme began in 1969 when "a 13-year old computer student at Hopkins' night school wound up counselling his classmates—who were in their mid-20's... The search for prodigies (now) begins each winter. Students are invited to take the College Board mathematics examination, a test usually reserved for high school seniors. Students scoring 640 or better out of a possible 800 on the test are eligible for the Hopkins' programme."

Considering the top priority that the Soviet government gives to its young citizens, it is more than probable that such programmes exist in the USSR too, although not much is known about them. The same seems to be true in the case of most of the European countries. It is more than likely that any society which respects its people will provide maximum opportunities to its child mental-giants to enable them to develop in the best possible way. Being such mental giants, they fully deserve the opportunity (ies). However, as one specialist says, "The real awesomeness is not so much (their) spectacular mentality, but that there are other undiscovered children like (them) elsewhere."

And that 'elsewhere' includes India, too. And here we come to the painful realization. What are

we doing with our child geniuses? For if we say we do not have them we will be wrong. Of course, a genius must have a rare combination of genes to become what he is. But the human race's total supply of genes is so mixed up that the genius combination might turn up 'anywhere'. And, once again, this 'anywhere' includes India, too.

Such geniuses are the nation's real wealth, and are always in a very short supply. Since Intelligence Tests seem to be the only easy, practical way of measuring intelligence, it is imperative that we use them as much as we can. For even the shortcomings of these tests can disappear only through that way.

Part Two

15 Tests

TEST-ONE

Time : 30 minutes

- I. There are twenty questions in all.
- II. Do the test in one sitting.
- III. The maximum marks for each question are mentioned in the test itself.
- IV. At the end of the test compare your score with the following.

SCORE CHART

- | | |
|----------------------|--------------------|
| 1. 85 and above | : Very superior |
| 2. Between 75 and 85 | : Superior |
| 3. Between 65 and 74 | : Superior average |
| 4. Between 55 and 64 | : Low average |
| 5. Less than 55 | : Low |

Marks

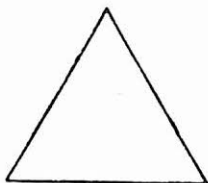
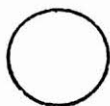
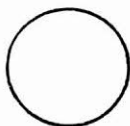
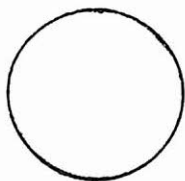
- | | |
|---|---|
| 1. Which is the odd man out: | 2 |
| VC | |
| MVC | |
| PVC | |
| PVSM | |
| MD | |
| 2. Which of the following is not a car: | 5 |
| DORAMBAASS | |
| ATIF | |
| ARDANDST | |
| TANSUNDIH | |
| DZEYI | |

3. Which of the following is not a poet: 5
ERMOH
GORTAE
LEYEHS
EAKTS
ACEWALL
4. Which is the odd man out: 5
SHOKRIE
FIAR
KEMUSH
AALT
EVD
5. Which of the following does not have an international airport: 2
DELHI
JALANDHAR
BOMBAY
MADRAS
CALCUTTA
6. Can you give three meanings of the word "Rider" ? 6
7. Fill in the blank: 5
24 23 21 18 ... 9 3
8. If 24 (67) 28
and 4 (19) 36
then 12 () 16 5
9. Fill in the blank: 5
15 13 12 11 9 9 ...
10. Fill in the blank: 5
6 7 9 13 21 ...

11. Fill in the blank:
64 48 40 36 34 ... 5
12. Fill in the blank:
11 12 14 ... 26 42 5
13. The scale of a map is $1/2$ inch to the mile
- (a) What actual area is represented by 2 square inches on the map ?
 - (b) What area on the map would represent 10 square miles of actual area ?
14. If my age is $3!$ years, how many years must relapse before I am $4!$ years old ? 6
15. A test match series consists of five matches in all. 7
- (a) What are the odds against Indian Captain winning the toss every time ?
 - (b) What are the odds against his winning it four times ?
16. The sum of the three prime numbers is 100. One of them exceeds another by 36. What are the numbers ? 6



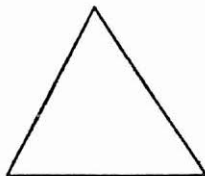
17. Which of the numbered figures can replace x?



X



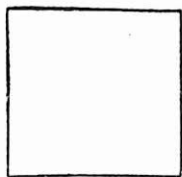
1



2



3



4

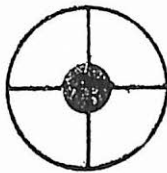
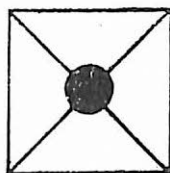
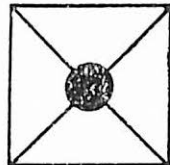
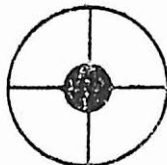
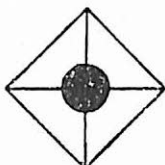
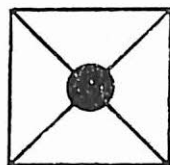
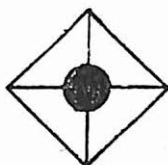
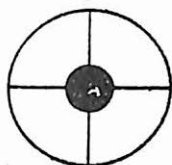


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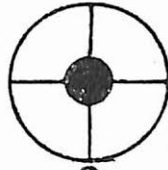
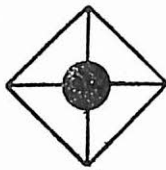
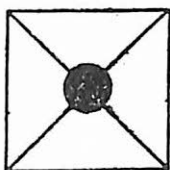


6

18 Which of the numbered figures can replace x?



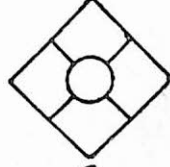
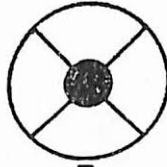
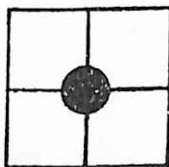
x



1

2

3

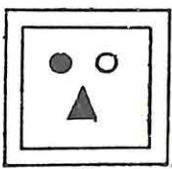
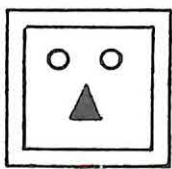
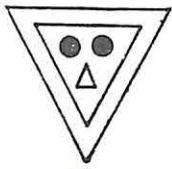
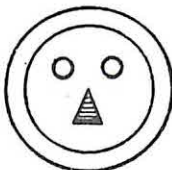
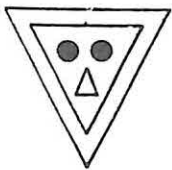
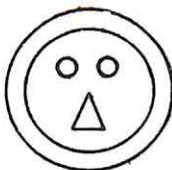
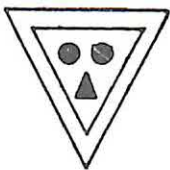
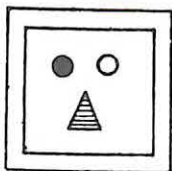
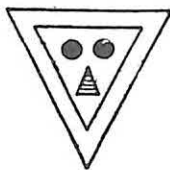
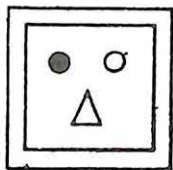
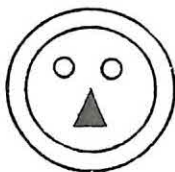


4

5

6

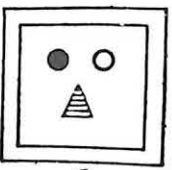
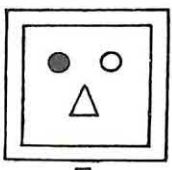
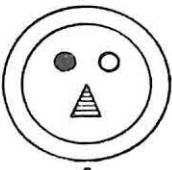
19. Which of the numbered figures can take the vacant place ?



1

2

3

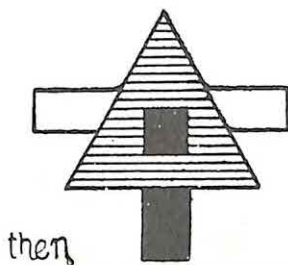
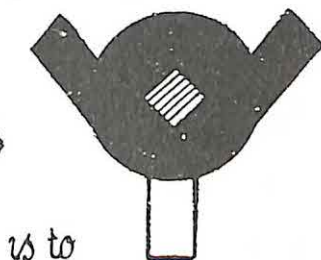
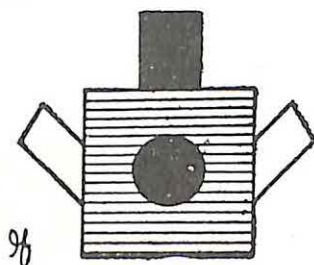


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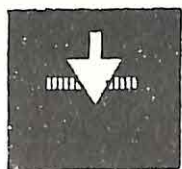
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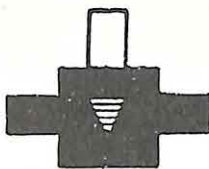
20. Which of the numbered figures can replace x ?



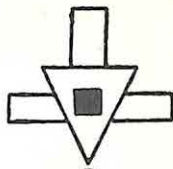
is to X



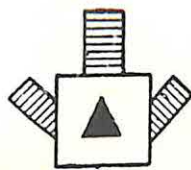
1



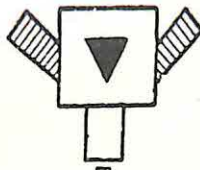
2



3



4



5

TEST-TWO

Time : 45 minutes

- I. There are twenty questions in all.
- II. Do the test in one sitting.
- III. The maximum marks for each question are mentioned in the test itself.
- IV. At the end of the test compare your score with the following.

SCORE CHART

- | | |
|----------------------|--------------------|
| 1. 85 and above | : Very superior |
| 2. Between 75 and 85 | : Superior |
| 3. Between 65 and 74 | : Superior average |
| 4. Between 55 and 64 | : Low average |
| 5. Less than 55 | : Low |

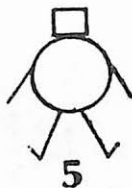
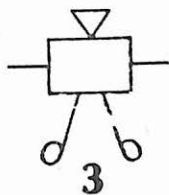
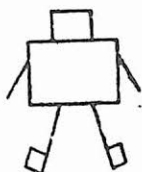
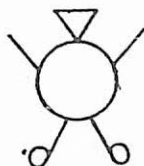
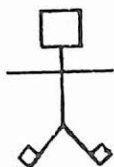
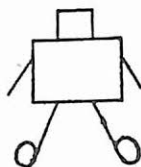
Marks

- | | |
|---|---|
| 1. What is common in :
FRANCE
SANTIAGO
ATLANTIC
SAN FRANCISCO | 5 |
| 2. Which is the odd-man-out :
GENERAL
FIELD MARSHALL
MAJOR
COLONEL
COMMANDER | 2 |

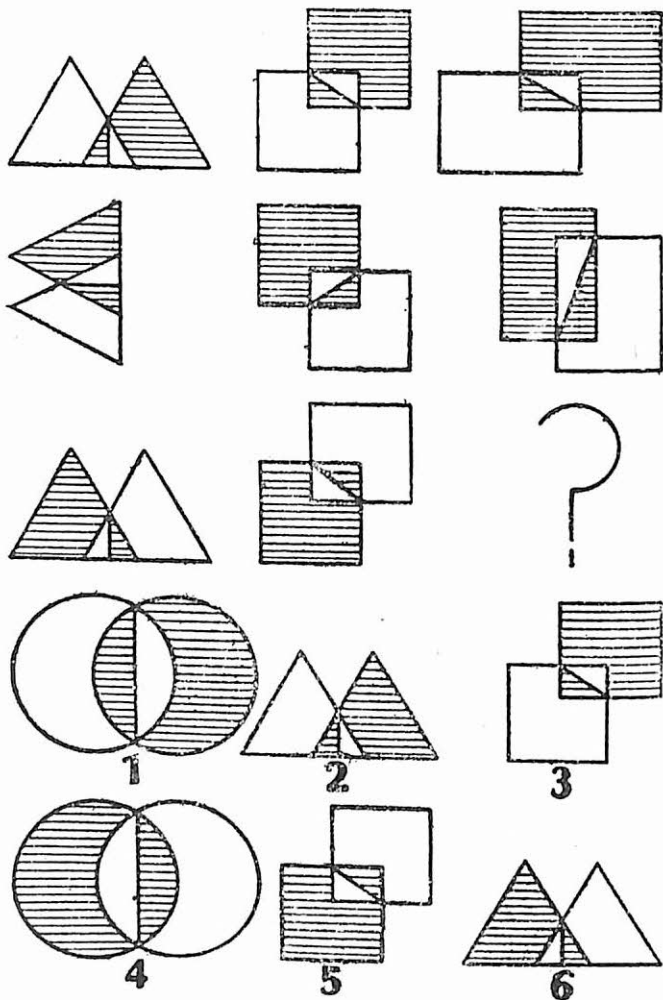
3. Arrange : 3
Soldier
Field Marshall
Captain
Colone!
Major
General
4. Which is the odd-man-out : 5
Mamba
Kathakali
Poika
Bhangra
Can Can
5. Which of the following does not conform with the rest : 5
Sargam
Crochet
Minim
Drut
Madhyam
6. Which is the odd-man-out : 7
King
City
Malayalam
Arthur
Ajay
7. A rectangular carpet has an area of 120 sq. ft. and a perimeter of 46 ft. What is the length of its diagonals ? 5
8. If you draw four cards at random from any ordinary pack of 52 playing cards what are the odds against your drawing four cards of the same suit ? 6

9. If you draw four cards at random from the same pack of 52 playing cards what are the odds against your drawing one card of each suit ? 6
10. If you draw four cards at random from an ordinary pack of 52 playing cards, what are you most likely to draw ? 6
11. If 17 (112) 39 5
then 28 () 49
12. Continue the sequence : 5
4 5 7 11 19 ...
13. Fill in the blank: 5
6 8 10 11 14 14 ...
14. Fill in the blank : 5
7 13 24 45 ...
15. Fill in the blank : 5
4 6 9 13 18 ...
16. Fill in the blank : 5
212 179 146 113 ...

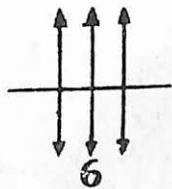
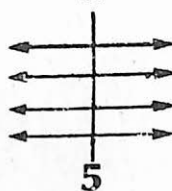
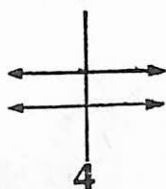
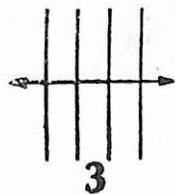
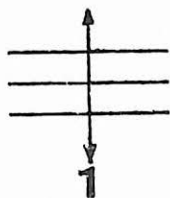
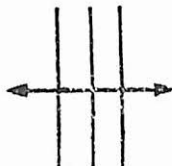
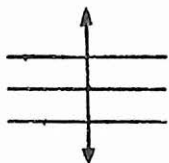
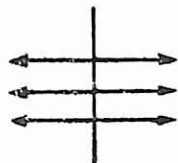
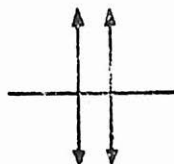
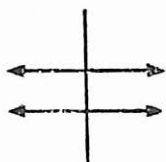
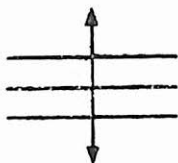
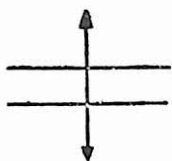
17. Which of the numbered figures can fill in the blank ?



18. Which of the numbered figures can fill in the blank?



19. Which of the numbered figures can fill in the blank?



20. Which of the numbered figure can fill in the blank?



X



1



2



3



4



5



6

TEST-THREE

Time : 45 Minutes

- I. There are twenty questions in all.
- II. Do the test in one sitting.
- III. The maximum marks for each question are mentioned in the test itself.
- IV. At the end of the test compare your score with the following:

SCORE-CHART

- | | |
|----------------------|--------------------|
| 1. 85 and above | : Very superior |
| 2. Between 75 and 85 | : Superior |
| 3. Between 65 and 74 | : Superior average |
| 4. Between 55 and 64 | : Low average |
| 5. Less than 55 | : Low |

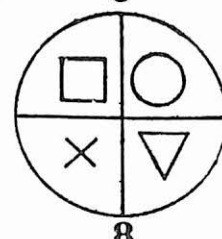
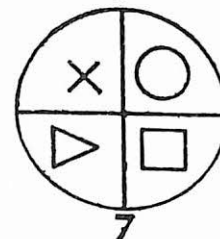
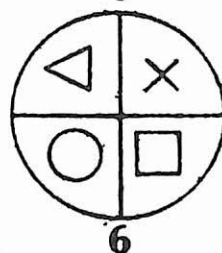
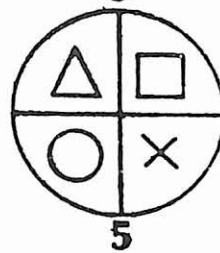
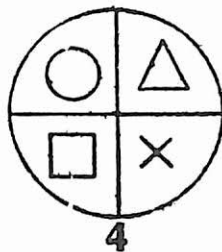
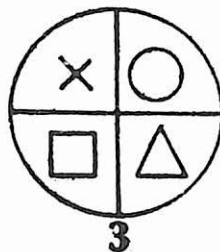
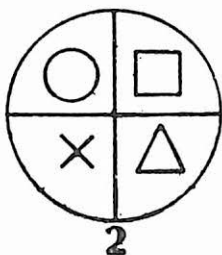
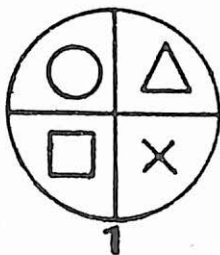
Marks

- | | |
|-------------------------------|---|
| 1. Which is the odd-man-out : | 5 |
| Live | |
| Liar | |
| Pert | |
| Garb | |
| Snip | |
| 2. Which is the odd-man-out | 5 |
| Flute | |
| Shahnai | |
| Tabla | |
| Clarinet | |
| Mouthorgan | |

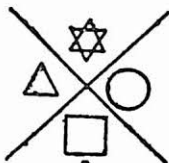
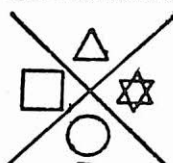
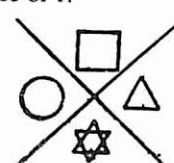
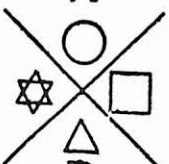
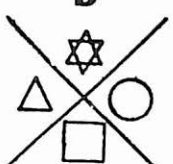
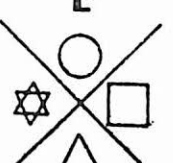
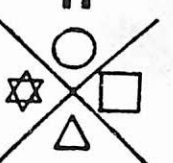
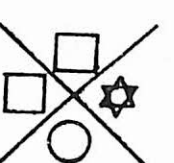
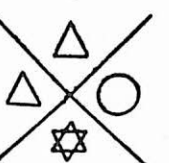
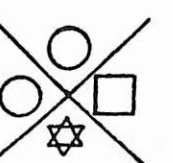
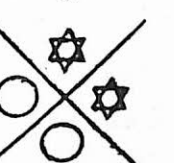
3. What three lettered word can be added to make the following into a four lettered word : 5
F
G
P
R
W
4. Which is the odd-man-out : 5
Paise
Cent
Yen
Centime
Palestra
5. Which of the following does not conform with the rest : 2
Paper
Envelope
Pen
Stationary
Postcard
6. Which is the odd-man-out : 5
Taint
Madam
Kant
Malayalam
Civic
7. How will you express the following in decimal fraction : 6
 $\frac{1}{7}$
 $\frac{2}{7}$
 $\frac{3}{7}$

8. If you toss ten coins, what are the odds against their all coming down heads ? 6
9. A rectangular carpet has an area of 60 square feet. Its diagonal plus its longer side = five times length of its shorter side. What are its dimensions ? 5
10. The total age of five children is 26 years. No two are of the same age. If the youngest one is 3 years old, how old is the oldest ? 6
11. Fill in the blank: 5
18 20 24 32...
12. Complete the series: 5
36 30 24 18 ...
13. Fill in the blank: 5
 $1/2$ $3/2$ $7/4$ $19/24$.../...
14. Fill in the blank: 5
 $4/1$ $3/6$ $8/5$ $7/...$
15. Complete the sequence: 5
3 7 16 35 ...
16. Fill in the blank: 5
 $2/3$ $4/7$./... $11/21$ $16/31$

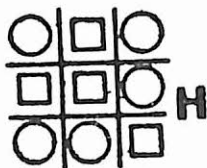
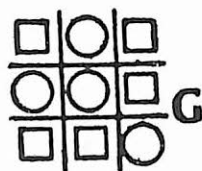
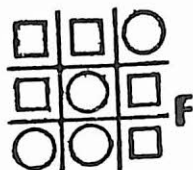
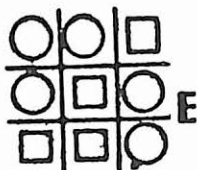
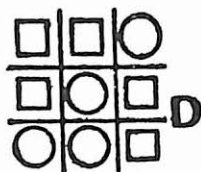
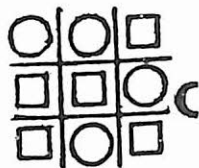
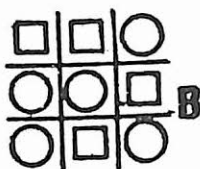
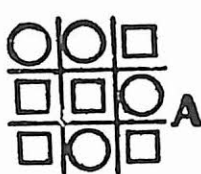
17. Arrange the following in such a way that they make four pairs?



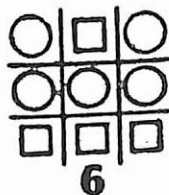
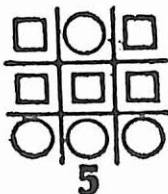
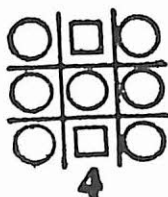
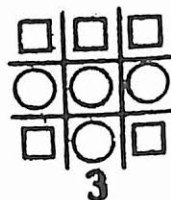
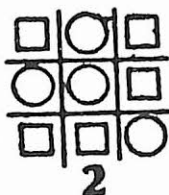
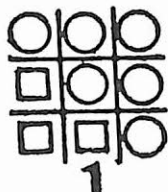
18. What numbered figure can take the place of I?

**A****B****C****D****E****F****G****H****I****1****2****3****4****5****6**

19. What numbered figure can take the place of I?



I



20. Which of the numbered figures can fill in the blank place?



1

2

3



4

5

6

TEST-FOUR

Time : 40 Minutes

- I. There are twenty questions in all.
- II. Do the test in one sitting.
- III. The maximum marks for each question are mentioned in the test itself.
- IV. At the end of the test compare your score with the following:

SCORE-CHART

- | | |
|----------------------|--------------------|
| 1. 85 and above | : Very superior |
| 2. Between 75 and 85 | : Superior |
| 3. Between 65 and 74 | : Superior average |
| 4. Between 55 and 64 | : Low average |
| 5. Less than 55 | : Low |

Marks

- | | |
|--|---|
| 1. Which is the odd-man-out:
ARIZONA
COLORADO
GUIANA
MINNESOTA
OKLAHOMA | 2 |
| 2. Which of the following does not conform with the rest:
ASCENSION
MARQUESAS | 5 |

MAURITIUS
SEYCHELLES
SOLOMONS

3. Which is the odd-man-out: 5
BAHAMAS
BERMUDAS
CAROLINES
HONDURAS
NEW HEBRIDES
4. Which is the odd-man-out: 2
Assam
Bihar
Madras
Siam
Punjab
5. Is Merimba the name of: 3
A native drug
A South American dance
A musical instrument
A film star
6. Which is the odd-man-out: 2
Vinci
Gogh
Degas
Shelley
Constable
7. If the arithmetic mean of two numbers is $6\frac{1}{2}$ and geometric mean 6, what are the numbers? 6
8. If the difference in the contents of two wooden cubes is 819 cubic inches, what are the lengths of their respective edges? 8

9. Sharma has several daughters, and so has Verma. There are three tickets for a cinema show which are offered to these girls. To avoid disappointments, their names are put into a pot, from which three names are drawn. The odds are 5 to 1 against all three tickets going to Sharma daughters. How many daughters does Sharma have ? And Verma ? 10
10. There are several identical cubes. If you paint two faces of each cube yellow, two faces red, and two faces blue, how many cubes will be different from one another ? 7
11. Fill in the blank: 5
2 3 5 9 17 ...
12. Complete the series: 5
25 20 15 10 ...
13. Fill in the blank: 5
3/D 4/H 5/M .../...
14. Fill in the blank: 5
4/7 6/10 9/15 13/...
15. Fill in the blank: 5
A D H M S ...
16. Fill in the blank: 5
3 5 8 13 22 ...

17. Which of the numbered figures can fill in the blank?



1



2



3



4

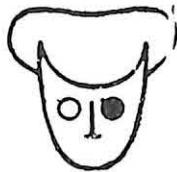
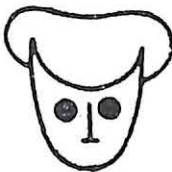
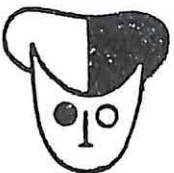
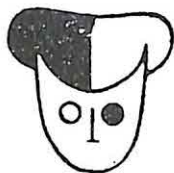


5



6

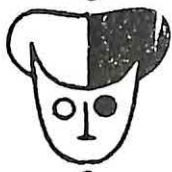
18. Which of the numbered figures can fill in the vacant place ?



1

2

3

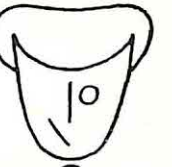
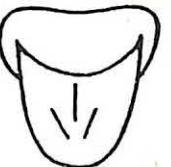
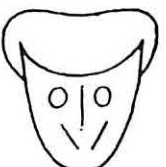
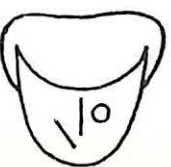
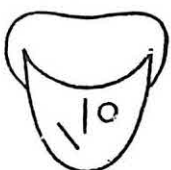
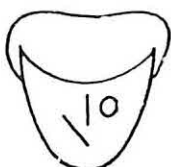


4

5

6

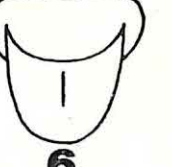
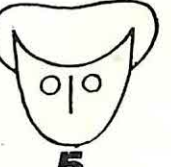
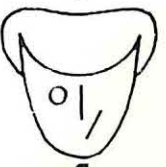
19. Which of the numbered figures can fill in the vacant place ?



1

2

3

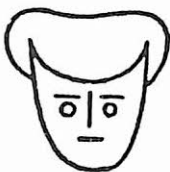


4

5

6

20. Which of the numbered figures can fill in the vacant place ?

**1****2****3****4****5****6**

TEST-FIVE

Time: One Hour

- I. There are twenty questions in all.
- II. Do the test in one sitting.
- III. The maximum marks for each question are mentioned in the test itself.
- IV. At the end of the test compare your score with the following:

SCORE-CHART

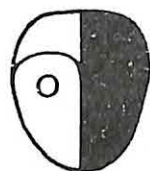
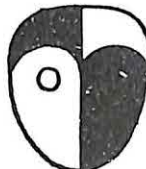
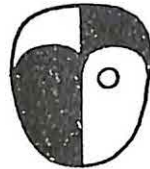
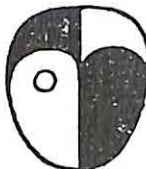
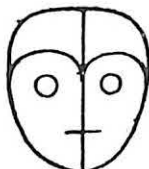
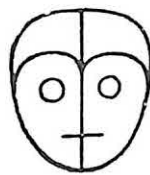
- | | |
|----------------------|--------------------|
| 1. 85 and above | : Very superior |
| 2. Between 75 and 85 | : Superior |
| 3. Between 65 and 75 | : Superior average |
| 4. Between 55 and 64 | : Low average |
| 5. Less than 55 | : Low |

- | | Marks |
|--|-------|
| 1. Which is the odd-man-out:
House Sparrow
Peacock
Carrion Crow
Wood Pigeon
Pheasant | 3 |
| 2. Which does not conform with the rest:
Coloratura
Baroque
Dominant Seventh
Counter Point
Suptum | 5 |

3. Which is the odd-man-out: 3
Hinduism
Pessimism
Mohammedanism
Animism
4. Which is the odd-man-out: 2
Shankar
Vishnu
Ram
Huitzilopochtli
Brahma
5. Which is the odd-man-out: 5
Real Tennis
Contract Bridge
Cricket
Rowing
Boxing
6. Which is the odd-man-out: 5
Calico
Colgate
Muslin
Nankeen
Port
7. If each of the letters ABCD represent a digit, and if B is larger than A, $AC \times BC = DDD$, what is the square of AC? 7
8. The combined volume of two cubes is 855 cubic inches. What are their respective edges? 7
9. A hand at Bridge consists of 13 cards. What is the most probable distribution of these 13 cards among the four suits? 7

10. And, what is the second most common distribution of these 13 cards among the four suits ? 6
11. Fill in the blank: 5
8 12 16 20 ...
12. Complete the series: 5
6 9 18 21 42 ...
13. Fill in the blank: 5
0 3 8 15 ...
14. If 148 (i 10) 368 5
then 243 () 397
15. If 143 (56) 255 5
then 218 () 114
16. Fill in the blank: 5
6 10 18 34 ...

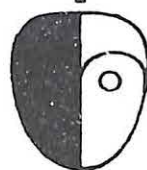
17. Which of the following numbered figures can fill in the blank?



1

2

3

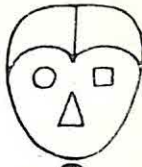
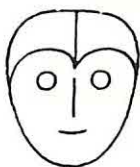
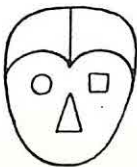
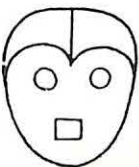
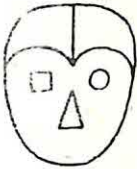
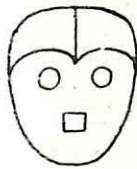
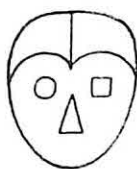
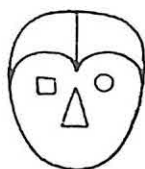
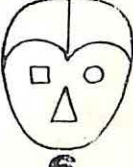


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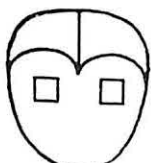
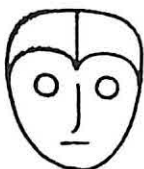
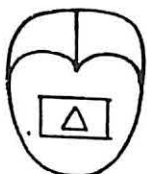
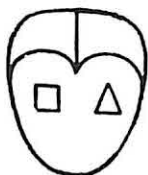
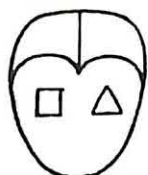
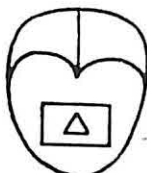
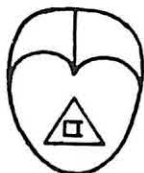
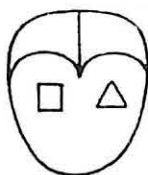
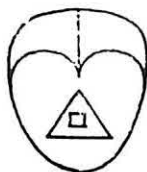
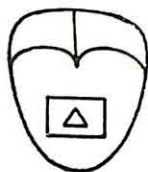
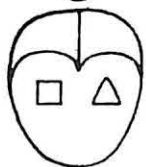
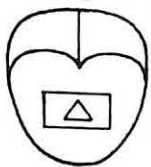
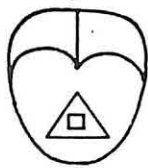
5

6

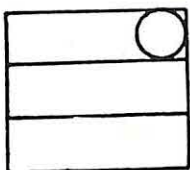
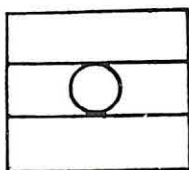
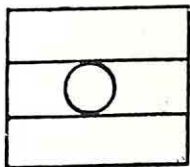
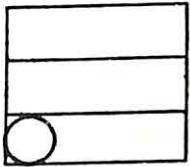
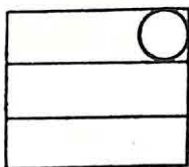
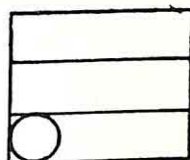
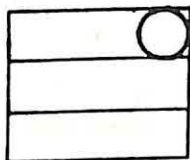
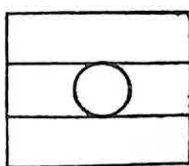
18. Which of the following numbered figures can fill in the blank?

**1****2****3****4****5****6**

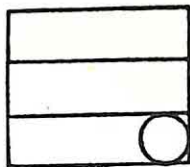
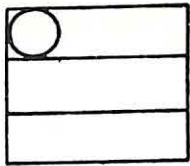
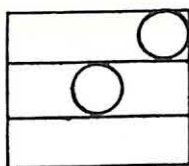
19. Which of the following numbered figures can fill in the blank?

**1****2****3****4****5****6**

20. Which of the following numbered figures can replace x?



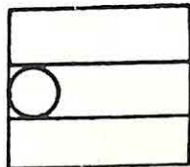
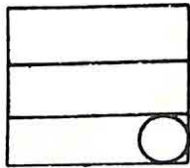
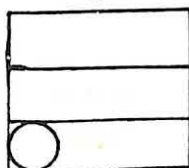
X



1

2

3



4

5

6

TEST-SIX

Time: 40 Minutes

- I. There are twenty questions in all.
- II. Do the test in one sitting.
- III. The maximum marks for each question are mentioned in the test itself.
- IV. At the end of the test compare your score with the following :

SCORE-CHART

- | | | |
|----|-------------------|--------------------|
| 1 | 85 and above | : Very superior |
| 2. | Between 75 and 85 | : Superior |
| 3. | Between 65 and 74 | : Superior average |
| 4. | Between 55 and 64 | : Low average |
| 5. | Less than 55 | : Low |

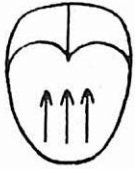
Marks

- | | | |
|----|---|---|
| 1. | Which is the odd-man-out:
Manet
Monet
Rosseti
Toscannini
Cezanne | 4 |
| 2. | Arrange:
Colonel
Major General
Lieutenant
Field Marshal | 6 |

- Brigadier
 - Captain
 - General
 - Lieutenant Colonel
 - Lieutenant General
 - Major
3. Which is the odd-man-out: 5
- Surdas
 - Homer
 - Henry Ford
 - Galileo
 - Milton
4. Which is the odd-man-out: 3
- Debentures
 - Preference Shares
 - Deferred Shares
 - Equity
5. Which is the odd-man-out: 5
- Esperanto
 - Ido
 - Hindi
 - Volapuk
 - Basic English
6. Which is the odd-man-out: 5
- Violin
 - Sarod
 - Drum
 - Harp
 - Double Bass
7. Which is the odd-man-out: 6
- Herring
 - Whale

- Shark
Barracuda
Cod
8. Which is the odd-man-out: 5
Byron
Shelley
Keats
Chamberlaine
Chaucer
9. Which is the odd-man-out: 6
Ant
Spider
Bee
Moth
Midge
10. Which is the odd-man-out: 5
Chariot
Car
Motor Cycle
Bus
Sleigh
11. Fill in the blank: 5
1 8 27 ...
12. If 12 (56) 16 5
then 17 () 21
13. If 16 (27) 43 5
then 29 () 56
14. Fill in the blank: 5
8 13 24 39 ...
15. If 196 (25) 324 5
then 329 () 137
16. Fill in the blank: 5
260, 216, 128, 108, 62, 54 ..., 27

17. Which of the numbered figures can replace x?



X



1



2



3



4

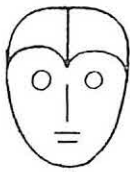
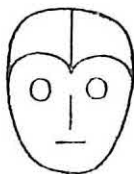
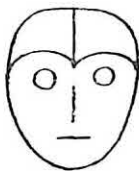
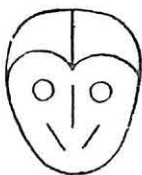


5



6

18. Which of the numbered figures can fill in the blank?



1



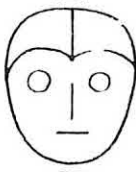
2



3



4

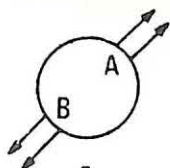
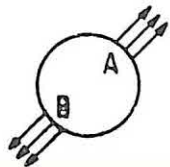
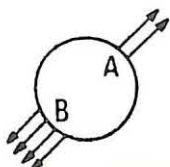
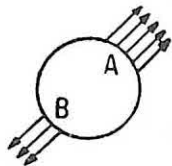
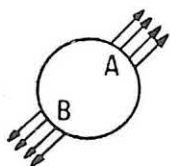
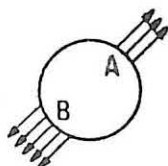
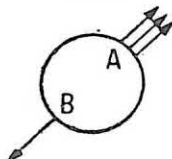
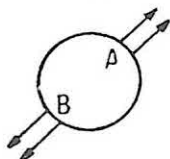
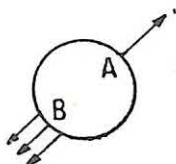
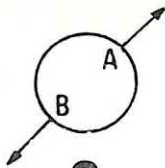
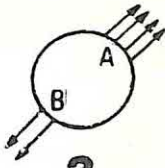
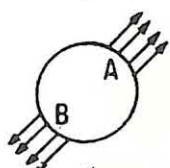
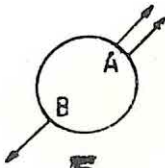
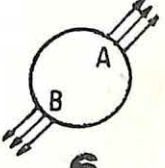


5

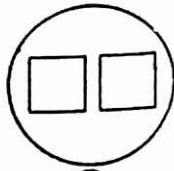
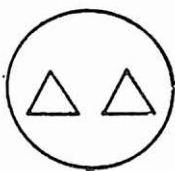
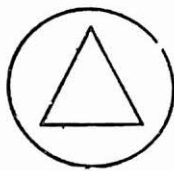
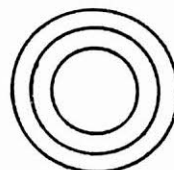
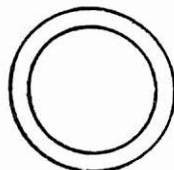
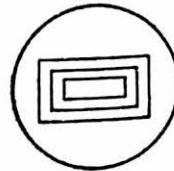
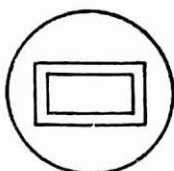
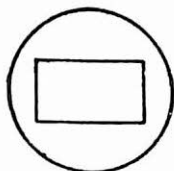
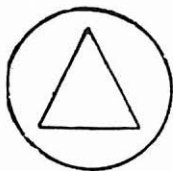


6

19. Which of the numbered figures can fill in the blank?

**1****2****3****4****5****6**

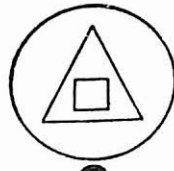
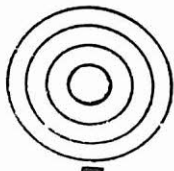
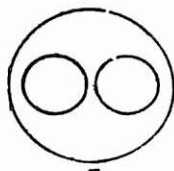
20. Which of the numbered figures can fill in the blank?



1

2

3



4

5

6

TEST-SEVEN

Time: One Hour

- I. There are twenty questions in all.
- II. Do the test in one sitting.
- III. The maximum marks for each question are mentioned in the test itself.
- IV. At the end of the test compare your score with the following:

SCORE-CHART

- | | |
|----------------------|--------------------|
| 1. 85 and above | : Very superior |
| 2. Between 75 and 85 | : Superior |
| 3. Between 65 and 74 | : Superior average |
| 4. Between 55 and 64 | : Low average |
| 5. Less than 55 | : Low |

Marks

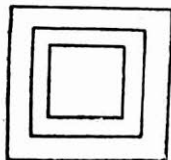
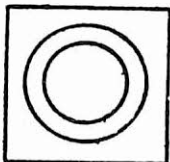
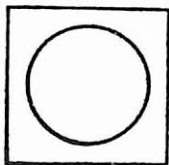
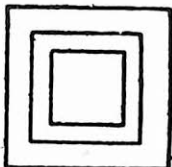
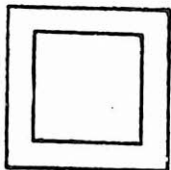
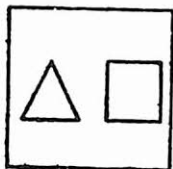
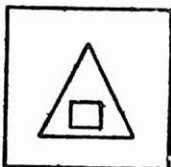
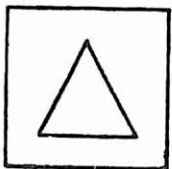
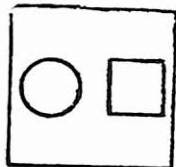
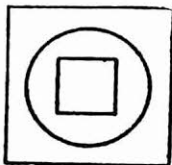
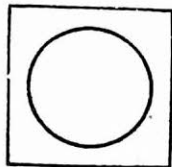
1. Arrange the following in the order in which they were put to use by man: 5
Boat
Steam Power
Fire
Iron
Rough Stone Weapon
Weaving
Electricity
Radium
Plough
Internal Combustion Engine

2. What is common in: 5
Defence
Hunting
Tracking Criminals
Leading the Blind
Amusement
3. Which is the odd-man-out: 5
Timocracy
Aristocracy
Democracy
Hypocrisy
4. Which is the odd-man-out: 3
Fantan
Roulette
Dicing
Crown
Chess
5. What five lettered word, when added to the following, will give them special meaning: 6
Art
Ball
Cap
Birds
Country
Diamond
Flag
Prince
Rod
Death
6. Which is the odd-man-out: 5
Companionway
Cockpit

- Galley
Hatch
Davit
7. Which is the odd-man-out: 5
August
September
October
November
December
8. Which is the odd-man-out: 5
Mozart
Bach
Socrates
Handel
Beethoven
9. Which of the following does not conform with the rest: 6
Dhow
Packet
Rickshaw
Barque
Junk
10. Which is the odd-man-out: 5
Herring
Porpoise
Shark
Ray
Sole
Plaice
11. Fill in the blank: 5
8 24 12 . . 8 54

- | | | |
|-----|--|---|
| 12. | If 532 (630) 217
Then 648 (444) | 5 |
| 13. | Complete the series:
5, 6, 7, 8, 10, 11, 14 . . | 5 |
| 14. | If 243 (222) 317
Then 548 () 621 | 5 |
| 15. | Fill in the blank:
36 28 24 22 . . | 5 |
| 16. | Fill in the blank:
W S O K | 5 |

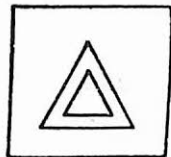
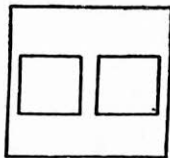
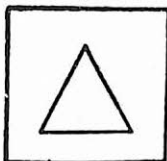
17. Which of the numbered figures can fill in the blank ?



1

2

3

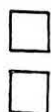
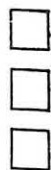
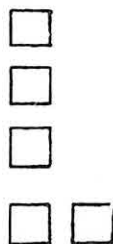
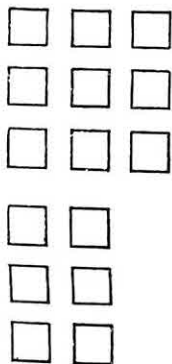


4

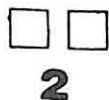
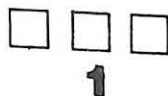
5

6

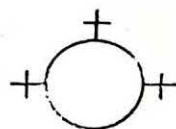
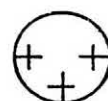
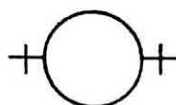
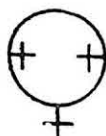
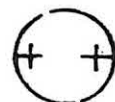
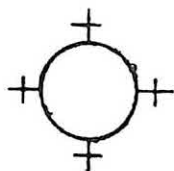
18. Which of the numbered figures can replace x?



X



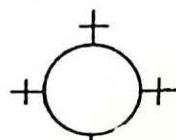
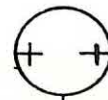
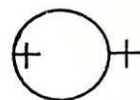
19. Which of the numbered of figures can fill in the blank?



1

2

3

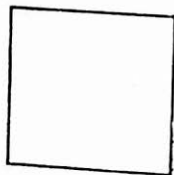
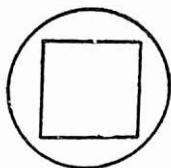
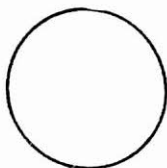
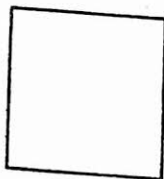
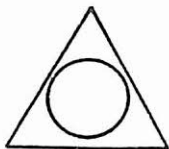
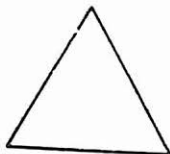
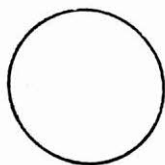


4

5

6

20. Which of the numbered figures can replace X?



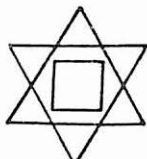
X



1



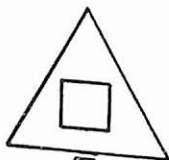
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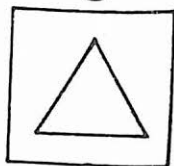
3



4



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6

TEST-EIGHT

Time: 40 Minutes

- I. There are twenty questions in all.
- II. Do the test in one sitting.
- III. The maximum marks for each question are mentioned in the test itself.
- IV. At the end of the test compare your score with the following:

SCORE-CHART

- | | |
|----------------------|--------------------|
| 1. 85 and above | : Very superior |
| 2. Between 75 and 85 | : Superior |
| 3. Between 65 and 74 | : Superior average |
| 4. Between 55 and 64 | : Low average |
| 5. Less than 55 | : Low |

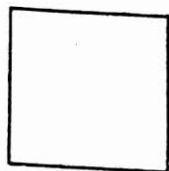
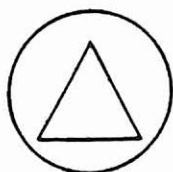
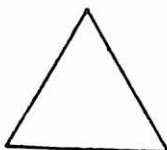
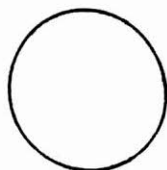
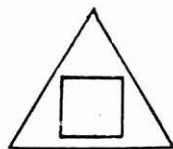
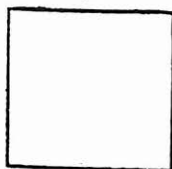
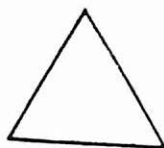
Marks

- | | |
|---------------------------------------|---|
| 1. What do these have in common: | 5 |
| Burn | |
| Brook | |
| Beck | |
| Runnel | |
| Rill | |
| 2. And, what do these have in common: | 3 |
| Monsieur | |
| Herr | |
| Signor | |
| Senor | |
| Mynheer | |

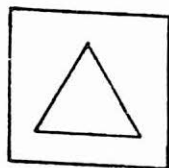
3. What about these? Do they have any thing
in common: 4
Houdini
Devant
Sorcar
Groock
Dadas
4. Which is the odd-man-out: 5
Hindi
Assamese
English
Bengali
Gujarati
5. Which is the odd-man-out: 5
Antigone
Odyssey
Oedipus Rex
Electra
Ajax
6. Is there something common to the following: 5
Dachshund
Dobermann Pinscher
Alsatian
7. Which is the odd-man-out: 3
Rembrandt
Shakespeare
Tintoretto
Raphael
Monet
8. How far a man whose eyes are five feet above
ground level see a flat plain? 6

9. How high the eyes should be on a plain to be able to see thirty miles? 6
10. A monkey is playing with the letters of the word "ALAN". What are the chances of its arranging them in the proper order at the first attempt? 7
11. If 132 (834) 285 6
then 214 () 117
12. Fill in the blank: 5
4 6 9 14 ..
13. Fill in the blank: 5
 $6/2$ $12/4$ $24/16$ $48/...$
14. Fill in the blank: 5
17 19 .. 20 15
15. Complete the series 5
R O L I
16. Which of these is the odd-man-out: 5
9 25 - 36 78 144 196

17. Which of the numbered figures can replace A ?



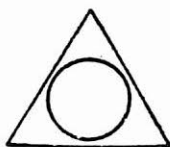
A



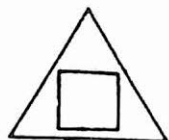
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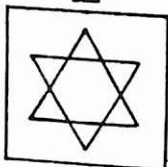
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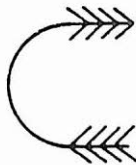
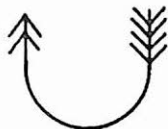


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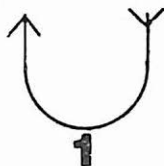


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18. Which of the numbered figures can replace B ?



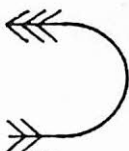
B



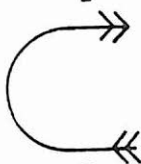
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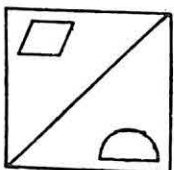
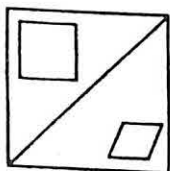
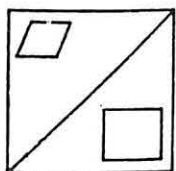
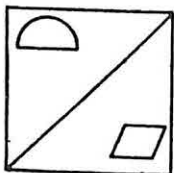
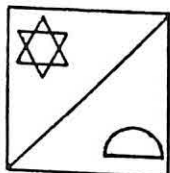
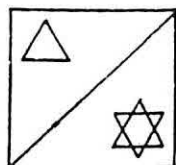
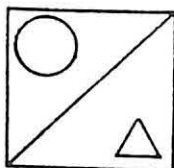
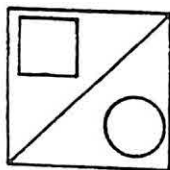


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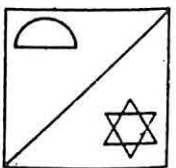
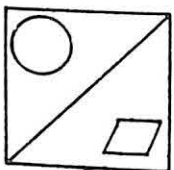
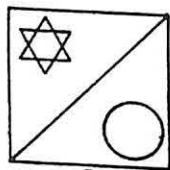


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19. Which of the numbered figures can replace C ?



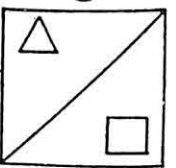
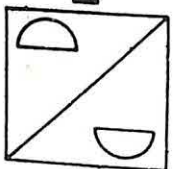
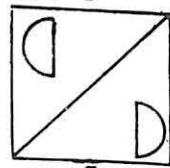
C



1

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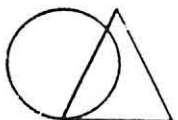
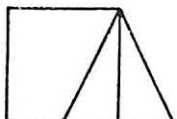
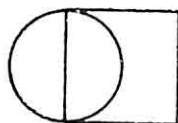
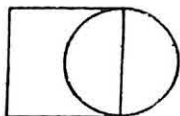
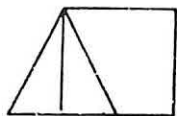
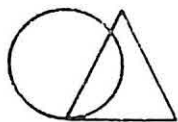


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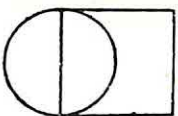
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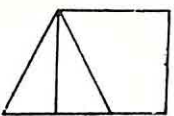
20. Which of the numbered figures can replace D ?



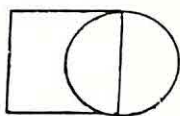
D



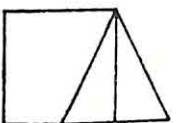
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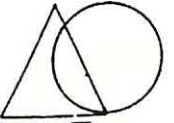
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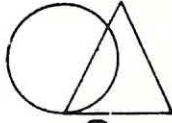
3



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TEST-NINE

Time: 30 Minutes

- I. There are twenty questions in all.
- II. Do the test in one sitting.
- III. The maximum marks for each question are mentioned in the test itself.
- IV. At the end of test compare your score with the following:

SCORE-CHART

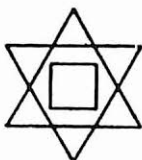
- | | |
|----------------------|--------------------|
| 1. 85 and above | : Very superior |
| 2. Between 75 and 85 | : Superior |
| 3. Between 65 and 74 | : Superior average |
| 4. Between 55 and 64 | : Low average |
| 5. Less than 55 | : Low |

- | | Marks |
|---|-------|
| 1. What do these have in common:
Gourmet
Gourmand
Glutton
Epicure | 5 |
| 2. And, what do these have a common:
Poltergeist
Medium
Planchette
Wraith
Doppleganger | 5 |

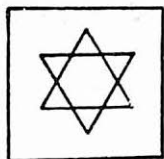
3. What about these? Do they have anything in common: 5
To Droop
Bunting
A Paving Stone
The Feathers on the Legs of the Horse
4. Which is the odd-man-out: 3
Germany
India
Austria
Denmark
Norway
5. Which is the odd-man-out: 4
Sarong
Dirndl
Burnous
Obi, or
Door
6. What seven lettered word, when added to the following, gives them a special meaning: 4
Gate
Valley
Rule
Age
Fleece
7. Where can you build a house whose every window would point due south? 5
8. If KREMLIN is to the USSR 5
Then WINDSOR is to
9. If WIMBLEDON is to LAWN TENNIS 7
Then EDGBASTON is to

10. Which is the odd-man-out: 7
100-Year War
War of Spanish Succession
Seven Years War
Napoleonic War
Crimean War
11. Fill in the blank: 5
7 15 .. 138 281
12. Complete the sequence: 5
8 12 10 16 12 ..
13. Fill in the blank: 5
3/552 4/992 5/....
14. Fill in the blank:
3 7 15 31 ..
15. Complete the series: 5
D/K M/F I/P ./.
16. Fill in the blank: 5
2 5 9 19 37 ..

17. Which of the following numbered figures can replace A ?



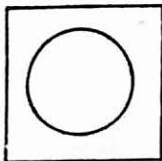
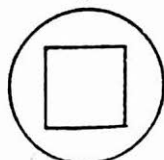
A



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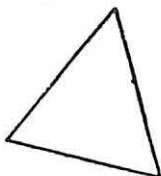
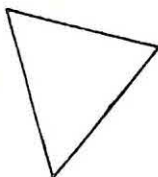
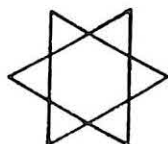
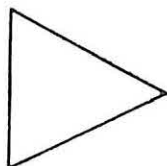
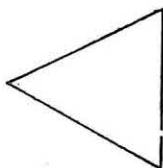
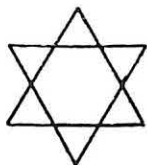
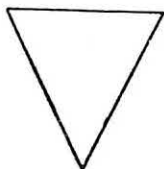
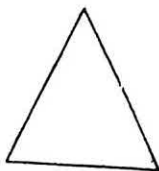


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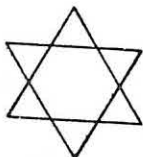
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6

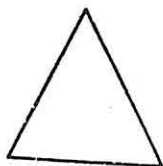
18. Which of the following numbered figures can replace B ?



B



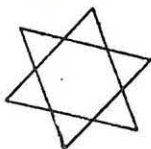
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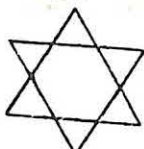
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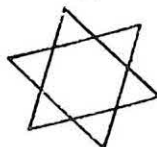
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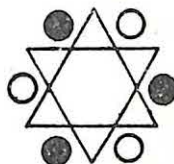
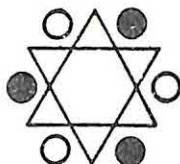
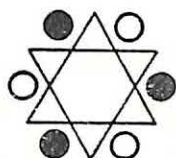
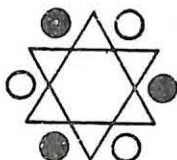
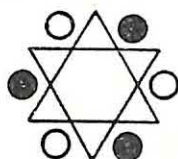
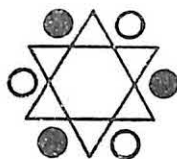
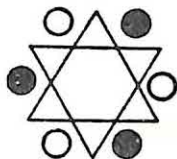


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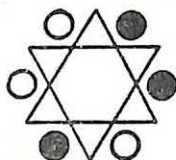


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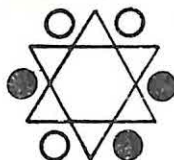
19. Which of the following numbered figures can replace C?



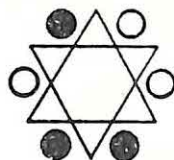
C



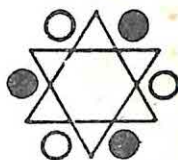
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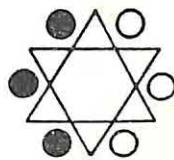
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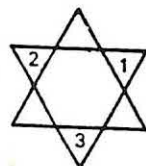
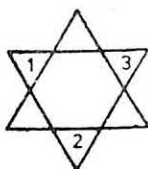
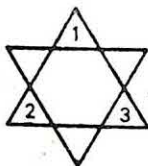
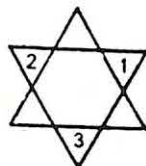
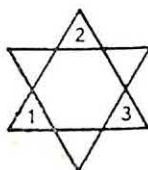
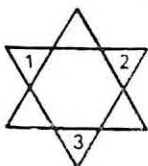
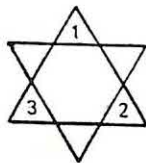


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6

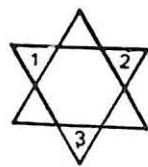
20. Which of the following numbered figures can replace D ?



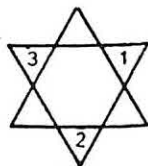
D



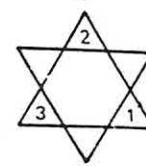
1



2



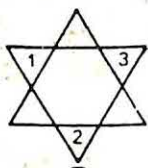
3



4



5



6

TEST-TEN

Time: 40 Minutes

- I. There are twenty questions in all.
- II. Do the test in one sitting.
- III. The maximum marks for each question are mentioned in the test itself.
- IV. At the end of the test compare your score with the following.

SCORE CHART

- | | |
|----------------------|--------------------|
| 1. 85 and above | : Very superior |
| 2. Between 75 and 85 | : Superior |
| 3. Between 65 and 74 | : Superior average |
| 4. Between 55 and 64 | : Low average |
| 5. Less than 55 | : Low |

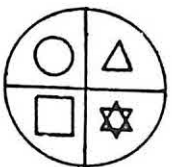
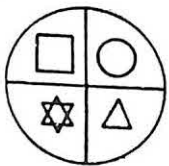
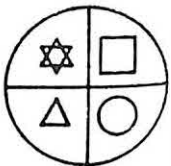
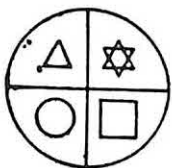
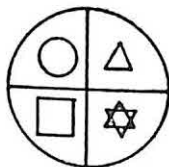
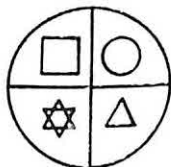
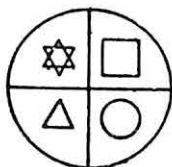
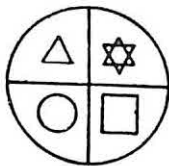
Marks

- | | |
|----------------------------------|---|
| 1. What do these have in common? | 5 |
| The Republic | |
| Utopia | |
| New Atlantis | |
| 2. Who is the odd-man-out? | 5 |
| Athos | |
| Porthos | |
| Aramis | |
| D'Artaganon | |

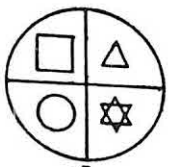
3. Which is the odd-man-out? 5
 Iron
 Steel
 Palladium
 Pallium
 Vanadium
4. Arrange the following inventions/discoveries
 against the proper creator 7
 Hargreaves Steam Engine
 James Watt Abstraction of phosphorus from iron ore
 Stephenson Aniline Dyes
 Gilchrist-Thomas Open Hearth Furnace
 Henry Cort Canales
 Parsons Coke for Smelting
 Perkins Spinning Jenny
 Siemens Steam Locomotive
 Brindley Pudding Iron
 Abraham Darby Turbine
5. What do these have in common? 7
 Philip
 Bartholomew
 Mathew
 Judas
 Judas Iscariot
6. What do these have in common?
 Roulette
 Dicing
 Fan-tan
 Betting
 Pitch and Toss

7. Which is the odd-man-out: 3
Cariappa
Maneckshaw
Raina
Choudhary
Thimmayya
8. Which is the odd-man-out: 4
Nehru
Gandhi
Ramgoolam
Shastri
Nanda
9. What is common in: 6
Ursa Minor
Cygnus
Taurus
Orion
Canis
10. Is there any relationship between 2 and 100,
apart from their being even numbers? 5
11. Fill in the blank: 5
A D G J:
12. Complete the sequence: 5
14/84 10/40 12/60 16/...
13. Complete the series: 5
A/E D/I G/N ./.
14. Fill in the blank: 5
16/37 28/49 41/62 58/..
15. Fill in the blank: 5
2 6 4 36 16 ..
16. Fill in the blank: 5
4 9 17 35 .. 139

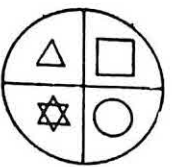
17. Which of the numbered figures can replace A ?



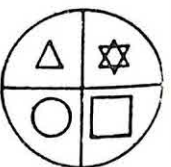
A



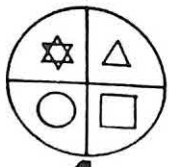
1



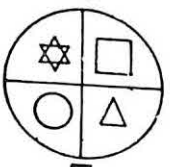
2



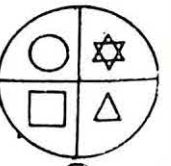
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4

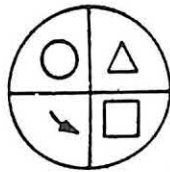
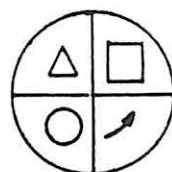
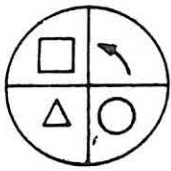
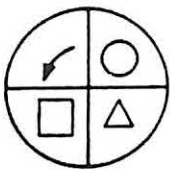
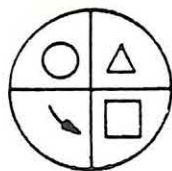
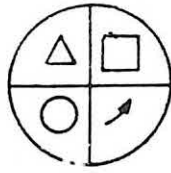
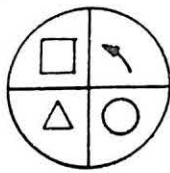
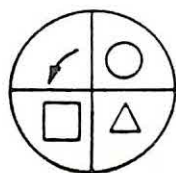


5

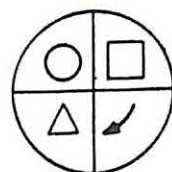


6

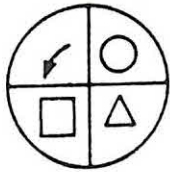
18. Which of the numbered figures can replace B ?



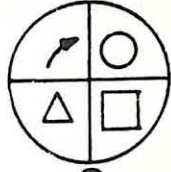
B



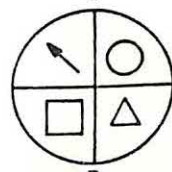
1



2



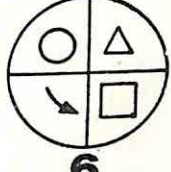
3



4

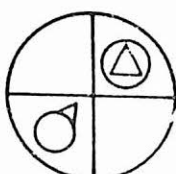
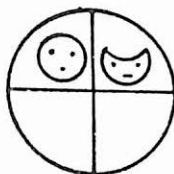
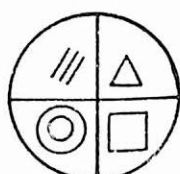
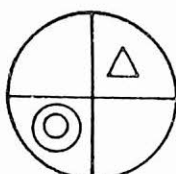
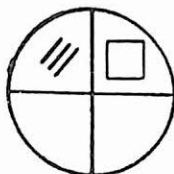
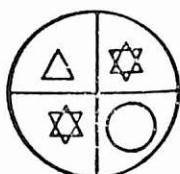
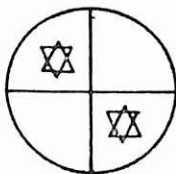
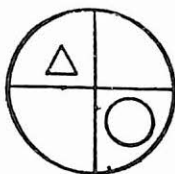


5

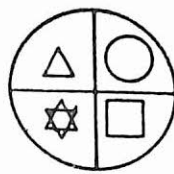


6

19. Which of the numbered figures can replace C ?



C



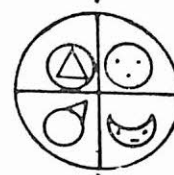
1



2



3



4

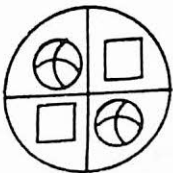
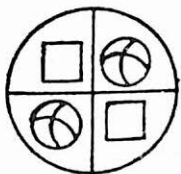
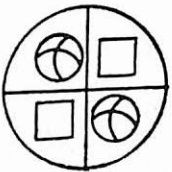
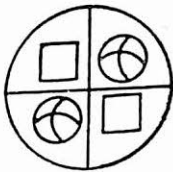
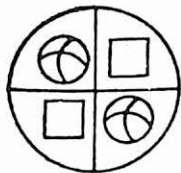
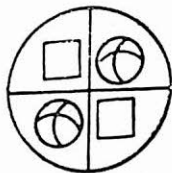
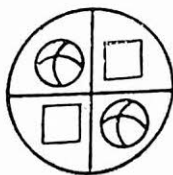
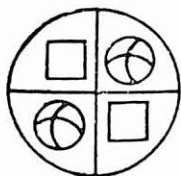


5

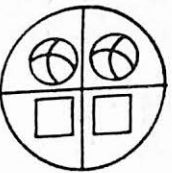
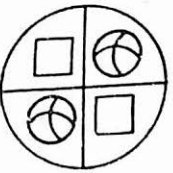
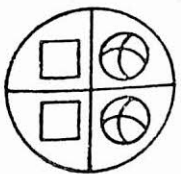


6

20. Which of the numbered figures can replace D?



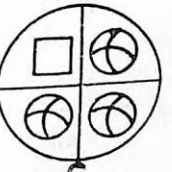
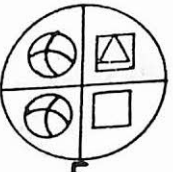
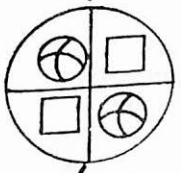
D



1

2

3



4

5

6

TEST-ELEVEN

Time: 30 Minutes

- I. There are twenty questions in all.
- II. Do the test in one sitting.
- III. The maximum marks for each question are mentioned in the test itself.
- IV. At the end of the test compare your score with the following.

SCORE CHART

- | | |
|----------------------|--------------------|
| 1. 85 and above | : Very superior |
| 2. Between 75 and 85 | : Superior |
| 3. Between 65 and 74 | : Superior average |
| 4. Between 55 and 64 | : Low average |
| 5. Less than 55 | : Low |

Marks

- | | |
|---|---|
| 1. Which is the odd-man-out:
Mussels
Scallops
Cock
Cockles | 5 |
| 2. Which of the following does not conform with the rest:
Gull
Terns
Cormonants
Peacock | 3 |

3. What do these have in common: 4
Sherman
Smuts
Tito
Wellington
Suvarov
4. What is the odd-man-out: 3
Grant
Churchill
Kitchener
McArthur
Morbrough
5. What do these have in common: 4
Marshall
Montgomery
Mountbatten
Nelson
Rommel
6. Who is the odd-man-out: 6
Clive
Cortes
Cromwell
Eisenhower
Drake
7. Which is the odd-man-out: 3
Chariot
Car
Bus
Waggon
Stretcher

8. What do these have in common: 5
 Lilliput
 Brobdingnag
 Laputa
 Lagado
9. Do the following times have something in common: 6
 2 p.m. in the USSR
 6 a.m. in Peru
 2 p.m. in Saudi Arabia
 9 p.m. in Melbourne
10. Arrange the following temperatures in order to their intensity: 10
 Temperature of the North Pole
 Temperature of the flame of Bunsen Burner
 Temperature of the Absolute Zero
 Temperature of the Human Body
 Temperature of the flame of Oxy-acetylene Burner
 Temperature of a red hot body
 Temperature of white heat
 Temperature of melting point of ice
 Temperature of boiling water
 Temperature of freezing point of alcohol 5
11. Fill in the blank:
 9/25 16/8 7/9 ./. .
12. Fill in the blank: 5
 71 68 77 50 . . . 5
13. If 836 (316) 112
 then 213 () 420

14. Fill in the blank:
5 7 4 6 3 .

5

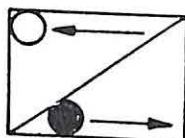
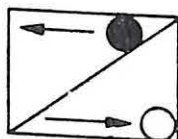
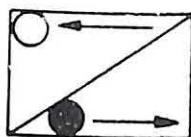
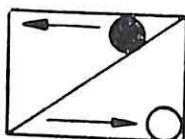
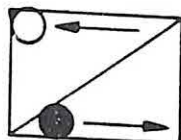
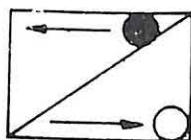
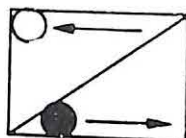
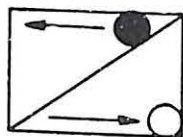
15. Complete the sequence
4/C F/7 11/J ./.

5

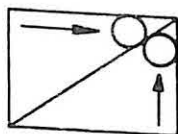
16. Fill in the blank:
2 5 26 ...

5

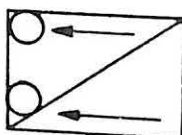
17. Which of the numbered figures can replace A?



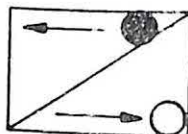
A



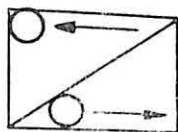
1



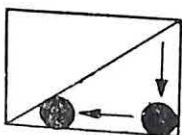
2



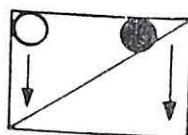
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4

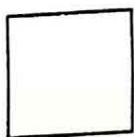
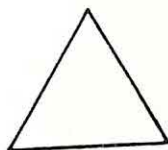
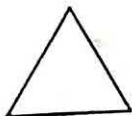
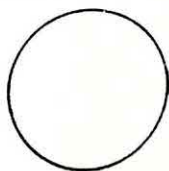
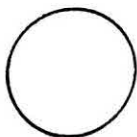
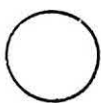


5



6

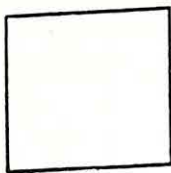
18 Which of the numbered figures can replace B?



B



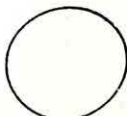
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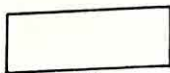
2



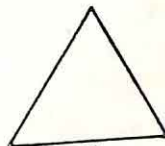
3



4

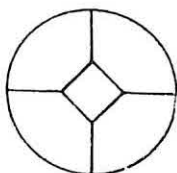
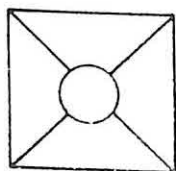
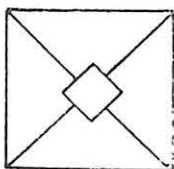
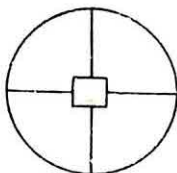
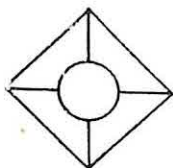
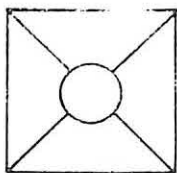
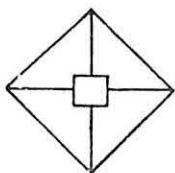
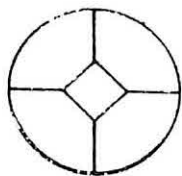


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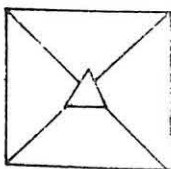
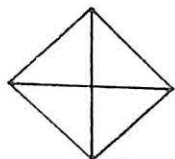
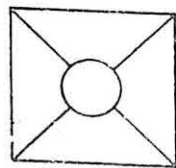


6

19. Which of the numbered figures can replace C?



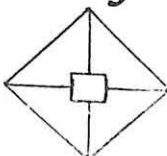
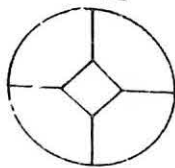
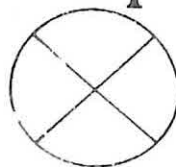
C



1

2

3

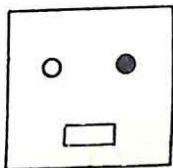
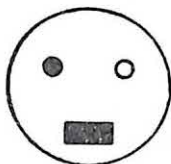
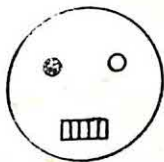
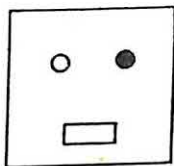
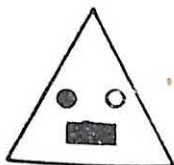
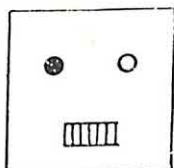


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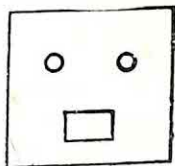
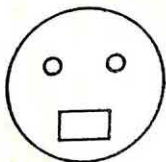
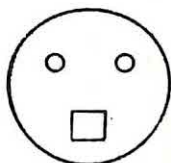
5

6

20. Which of the numbered figures can replace D?



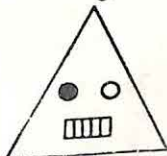
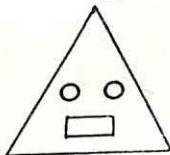
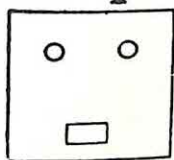
D



1

2

3



4

5

6

TEST-TWELVE

Time: 40 Minutes

- I. There are twenty questions in all.
- II. Do the test in one sitting.
- III. The maximum marks for each question are mentioned in the test itself.
- IV. At the end of the test compare your score with the following:

SCORE-CHART

- | | |
|----------------------|--------------------|
| 1. 85 and above | : Very superior |
| 2. Between 75 and 85 | : Superior |
| 3. Between 65 and 74 | : Superior average |
| 4. Between 55 and 64 | : Low average |
| 5. Less than 55 | : Low |

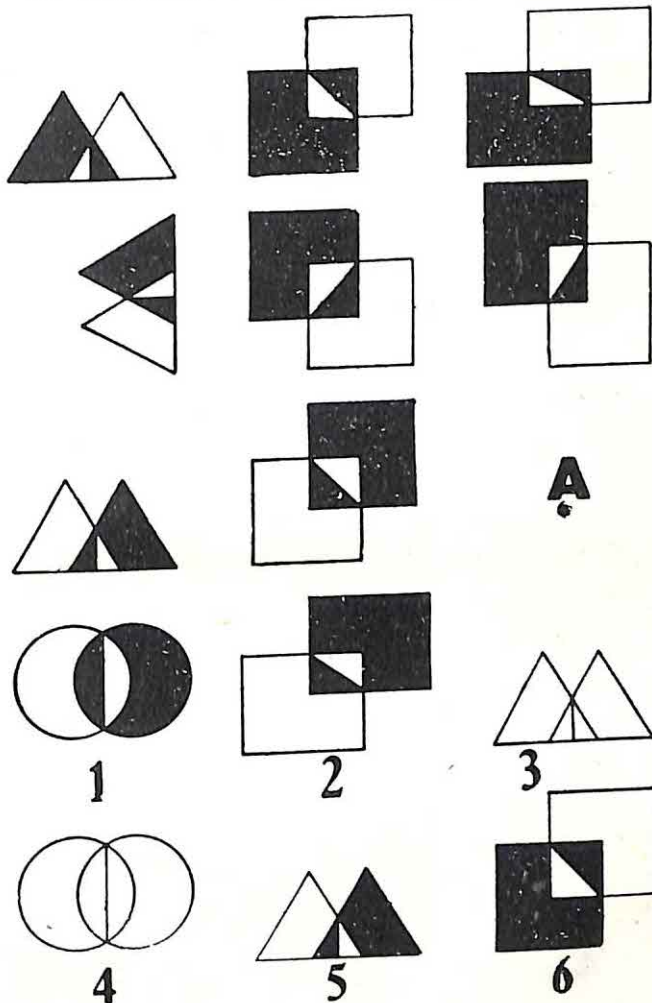
Marks

- | | |
|--|---|
| 1. What do these have in common:
Foch
Garibaldi
De Gaulle
Genghis Khan
Gordon | 4 |
| 2. And, what do these have in common:
Puree
au gratin
Ragout
Flan
Braised | 5 |

3. What about these? Do they have anything in common: 6
Hera
Athena
Aphrodite
4. What about these: 5
Junk
Sampan
Keel
Xebec
Felucca
5. What do these have in common: 5
Feroes
Leeward
Mauritius
Lakshadweep
6. What do these have in common: 5
Mein Kempf
Marco Polo's Travels
Pilgrim's Progress
De Profundis
7. A man's standard of living is unchanged. But he is running into debts. What can be the possible reasons? 5
8. How many Beatles were there? 5
9. What do these have in common? 5
Sombrero
Fez
Mitre
Kepi
Feathers

10. Can you spot at least five things which could
not have been there a century ago? 5
11. If 16 (96) 12 5
then 10 () 15
12. Fill in the blank: 5
5/8 10/7 10/13 17/14 ./. .
13. If 112(190)17 5
then 268()107
14. If 16(93)15 5
then 14()12
15. Fill in the blank: 5
82 97 114 133 . . . ,
16. Fill in the blank: 5
2 8 5 6 8 . 11

17. Which of the numbered figures can replace A?



18. Which of the numbered figures can replace B?



B



1



2



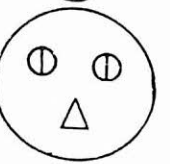
3



4



5



6

19. Which of the numbered figures can replace C?



C



1

2

3

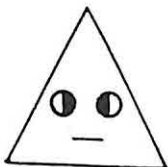
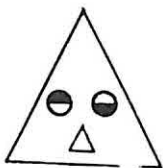
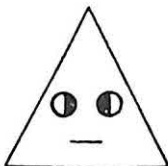
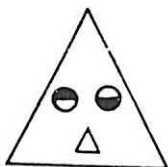
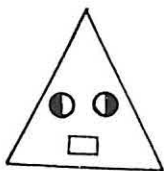
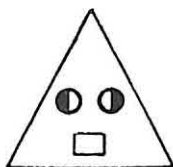
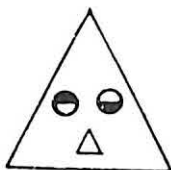
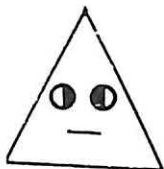


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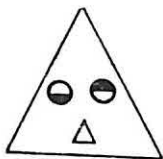
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6

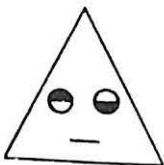
20. Which of the numbered figures can replace D?



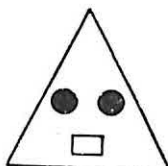
D



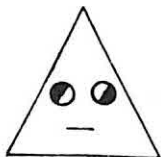
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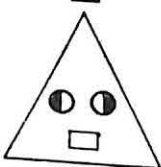
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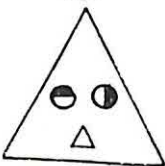
3



4



5



6

TEST-THIRTEEN

Time: 30 Minutes

- I. There are twenty questions in all.
- II. Do the test in one sitting.
- III. The maximum marks for each question are mentioned in the test itself.
- IV. At the end of the test compare your score with the following:

SCORE-CHART

- | | |
|----------------------|--------------------|
| 1. 85 and above | : Very superior |
| 2. Between 75 and 85 | : Superior |
| 3. Between 65 and 75 | : Superior average |
| 4. Between 55 and 64 | : Low average |
| 5. Less than 55 | : Low |

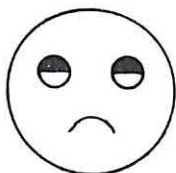
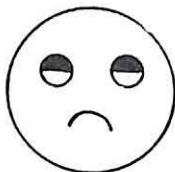
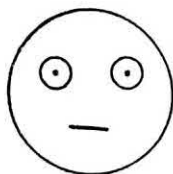
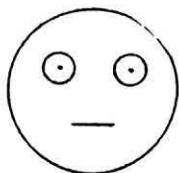
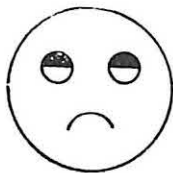
Marks

- | | |
|---------------------------------------|---|
| 1. What do these have in common: | 4 |
| Etna | |
| Stromboli | |
| Hecla | |
| Vesuvius | |
| Cotopaxi | |
| 2. And, what do these have in common: | 5 |
| Nirala | |
| Agyeya | |
| Dinakar | |
| Bairagi | |
| Firaq | |

3. Which of the following is not a poet: 6
NSOYNNTE
GNINBWOR
CERUHAC
DGEEIRLOC
ROHB
4. Which of the following is not a novelist: 6
LEISW
KINSEDC
OCSTT
USONHD
DYHAR
5. Which of the following is not an explorer: 6
MUNSONAD
IERCART
NSOJZ
DYHAR
USONHD
6. Which of the following is not a poet: 6
EADINT
TLEOI
OEPICRNCUS
CKEERFL
MOERH
7. What is common in: 3
Drama
Opera
Farce
Pantomime
Promenade Concert
8. Is there anything common in Minerva and an owl? 5

9. Do Cynosurus and Cynolatra have anything in common? 4
10. What do zebra and horse have in common: 4
11. If $96(16)12$ then $88()11$ 5
12. If $98(54)64$ then $81()36$ 5
13. If $651(331)342$ then $449()523$
14. Fill in the blank 5
 $8 \quad 12 \quad 24 \quad 60 \quad \dots$
15. If $42(44)38$ then $23()28$ 5
16. Fill in the blank 5
 $2 \quad 7 \quad 24 \quad 77 \quad \dots$

17. Which of the numbered figures can replace A?



A



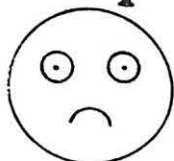
1



2



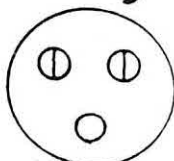
3



4



5



6

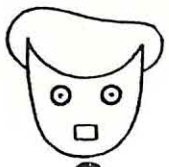
18. Which of the numbered figures can replace B?



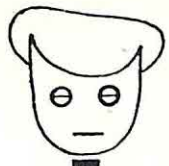
B



1



2



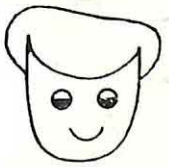
3



4

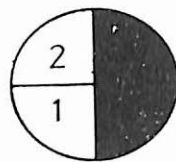
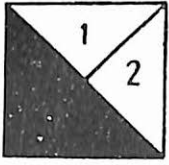
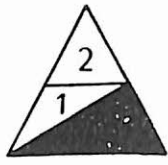
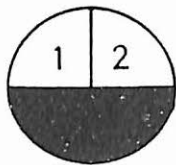
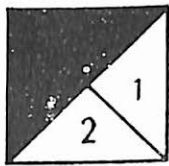
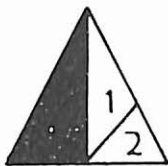
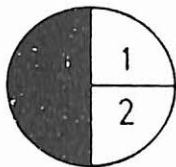


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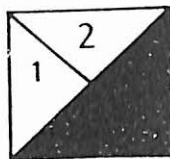


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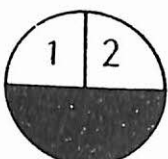
19. Which of the numbered figures can replace C?



C



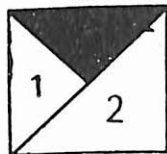
1



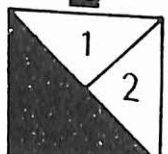
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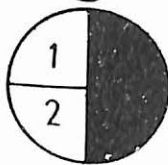
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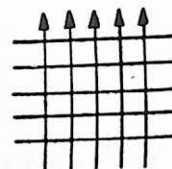
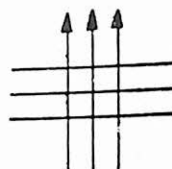
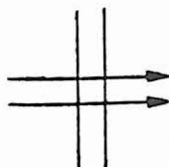
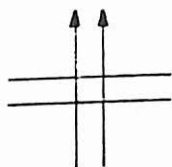
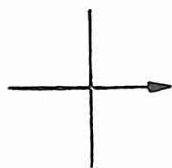


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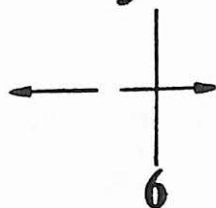
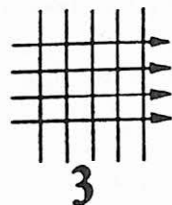
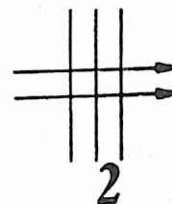
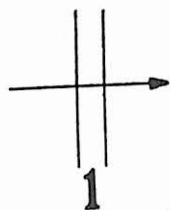


6

20. Which of the numbered figure can replace C?



D



TEST-FOURTEEN

Time: 30 Minutes

- I. There are twenty questions in all.
- II. Do the test in one sitting.
- III. The maximum marks for each question are mentioned in the test itself.
- IV. At the end of the test compare your score with the following:

SCORE-CHART

1. 85 and above	: Very superior
2. Between 75 and 85	: Superior
3. Between 65 and 74	: Superior average
4. Between 55 and 64	: Low average
5. Less than 55	: Low

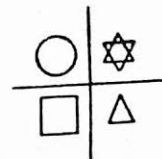
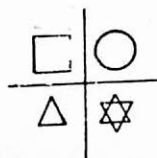
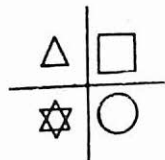
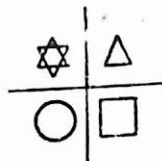
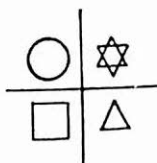
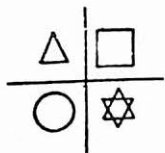
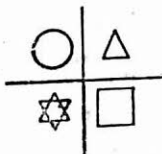
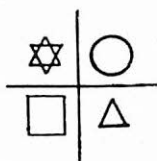
Marks

1. Which of the following is not an explorer? 4
AASTMN
OBUMUSCL
ZINME
ZOMART
ALANEGLM
2. Which of the following is not an artist? 4
MILACHENGEIO
TILLEM
CERUHAC
ICASOSP
APRAHEL

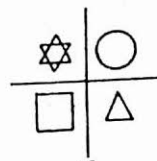
3. Which of the following is not a scientist? 6
ROHB
ABIRD
TLEOI
LYOEB
OEPICRNCUS
4. Which of the following is not a poet? 6
ESATK
IEURC
WOOLLEFNGL
OOWWRRDSTH
TONLMI
5. Which of the following is not a scientist? 5
IEURC
WARIDN
MOERH
AYDV
DONISE
6. Which of the following is not an artist? 5
BRATENDMR
NORIRE
GNINBWOR
YENORLDS
UBENERS
7. What do repique and pique have in common? 5
8. Where can you build a house whose every window will point due-south? 5
9. Do sphairistike and lawn tennis have anything in common? 5

10. Do mangaia, atin, and aitutaki have anything in common? 5
11. Fill in the blank:
8 10 14 18 ...34 50 66
12. Fill in the blank: 5
7 9 5 11
4 15 12 7
13 8 11 ...
13. Fill in the blank: 5
2 4 3
5 7 6
7 5 .
14. Fill in the blank: 5
2 2 4 8 32 ...
15. Fill in the blank : 5
16/32 15/33 17/31 14/34 .../...
16. Fill in the blank :
7 10 9 12 11

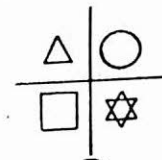
17. Which of the numbered figures can replace A?



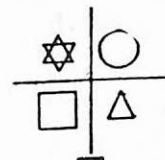
A



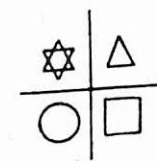
1



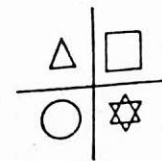
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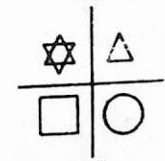
3



4

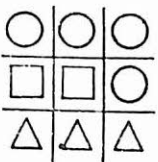
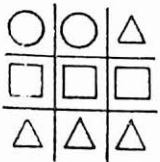
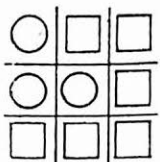
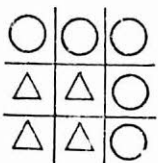
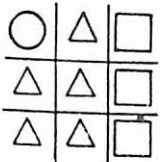
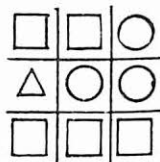
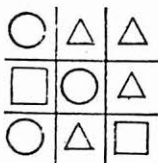
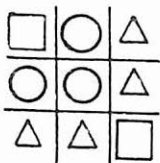


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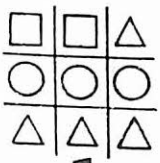


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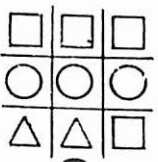
18. Which of the numbered figures can replace B?



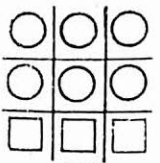
B



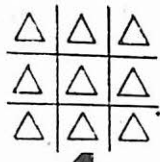
1



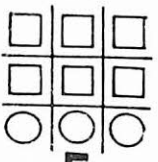
2



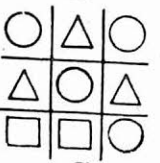
3



4

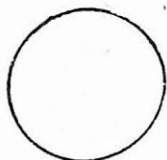


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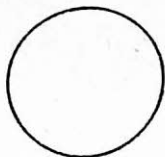
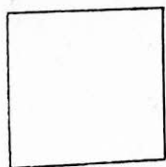


6

19. Which of the numbered figures can replace C?



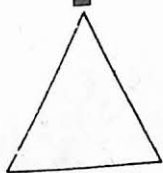
C



1

2

3

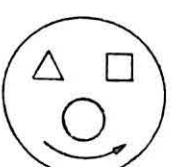
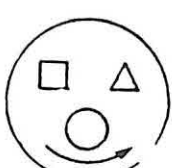
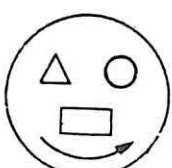
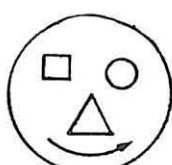
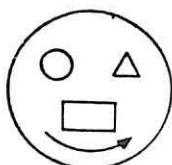
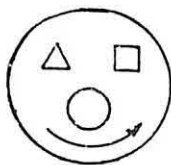


4

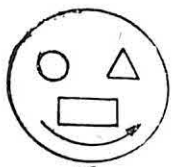
5

6

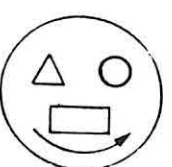
20. Which of the numbered figures can replace D?



D



1



2



3



4



5



6

TEST-FIFTEEN

Time: 40 Minutes

- I. There are twenty questions in all.
- II. Do the test in one sitting.
- III. The maximum marks for each questions are mentioned in the test itself.
- IV. At the end of the test compare your score with the following :

SCORE-CHART

- | | |
|----------------------|--------------------|
| 1. 85 and above | : Very superior |
| 2. Between 75 and 85 | : Superior |
| 3. Between 65 and 74 | : Superior average |
| 4. Between 55 and 64 | : Low average |
| 5. Less than 55 | : Low |

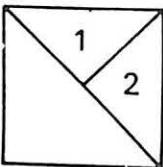
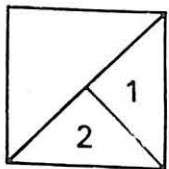
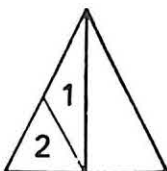
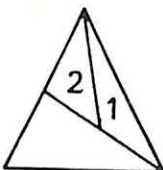
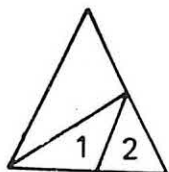
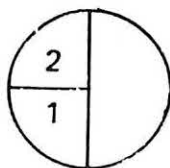
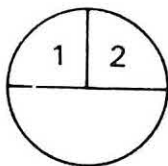
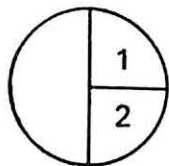
Marks

1. Which of the following is not a scientist 6
EENNIIST
ESATK
AAADYRF
ARAMN
LINGEMF
2. Which of the following is not an artist 5
ZECANEN
TONLMI
GEDAS
AGYO
CIVNI

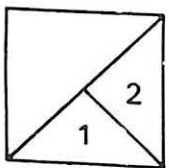
3. Which of the following is not a musician 6
TCHAIKOVSKY
ZOMART
AASTMN
ASSUSTR
DENALH
4. Which of the following is not a musician 6
LIVULANS
UBESCHRT
OBUMUSCL
UMASNCH
EGIRG
5. Which of the following is not a musician 5
ABCH
THEEBOVEN
ZIMNE
SABRHM
IPOCHN
6. Which of the following towns is not in India 4
PILALIRACHURIT
MUMJA
ISHANGWTON
AAAALLDHB
AGRUPN
7. Do mathematics, Charles Lutwidge Dodgson and Alice In Wonderland have anything in common ? 4
8. If a monkey is playing with the letters of the word "ALAN", what are the chances of its arranging them in the proper order at the first attempt ? 6

9. A coin is tossed and comes down head 100 times. What are the chances of its coming down tail the next time ? 5
10. Which is the odd man out ? 3
Bharat Natyam
Kathakali
Kathak
Manipuri
Bhangra
11. Fill in the blank: 5
2 5 8 11 ...
12. What is the square root of $1/4$? 5
13. Fill in the blank: 5
8 15 7
9 17 8
2 ... 12
14. Fill in the blank: 5
5 15 25
6 16 23
7 17 ...
15. Fill in the blank: 5
28 26 2
29 26 3
30 26 .
16. Fill in the blank: 5
5 10 7
16 40 8
15 ... 9

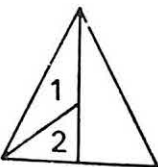
17. Which of the numbered figures can replace A?



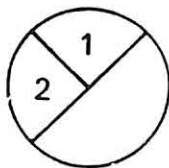
A



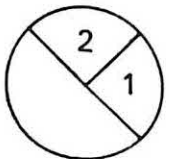
1



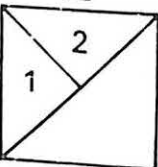
2



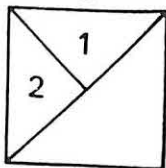
3



4

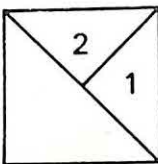
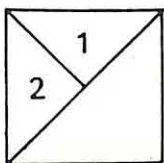
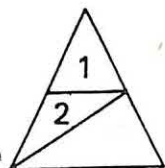
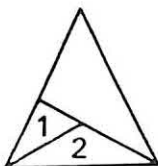
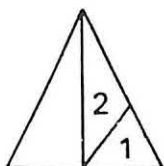
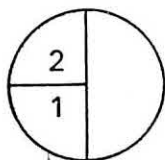
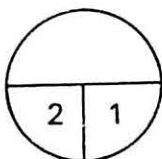
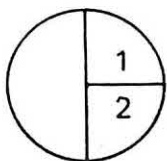


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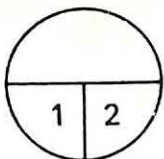


6

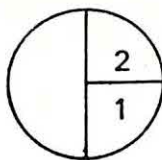
18. Which of the numbered figures can replace B?



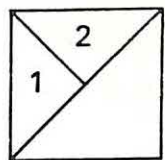
B



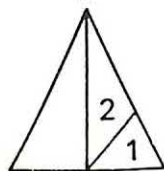
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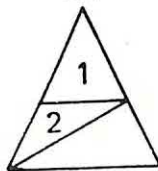
2



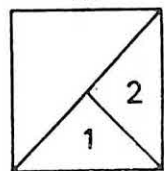
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4

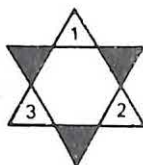
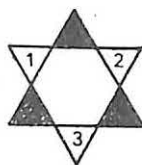
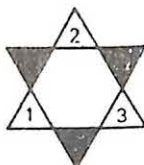
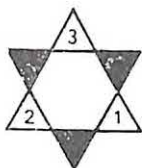
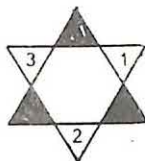
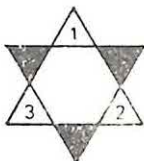
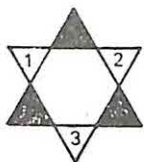


5

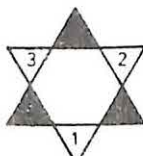
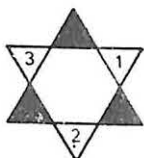
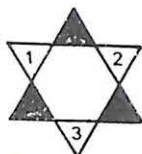


6

19. Which of the numbered figures can replace C?



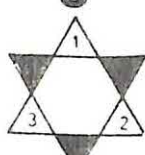
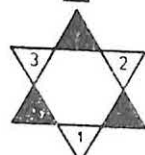
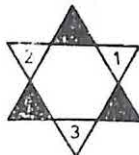
C



1

2

3

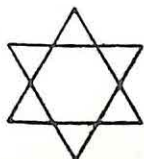
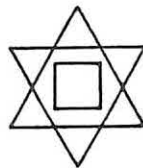
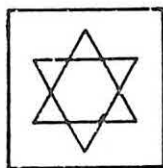
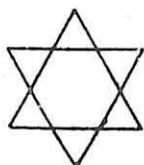
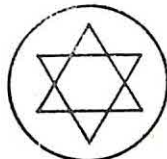
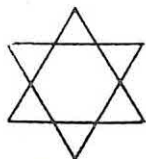


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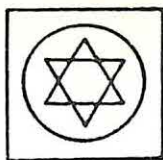
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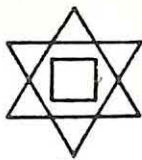
20. Which of the numbered figures can replace D?



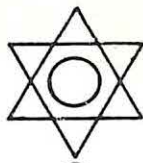
D



1



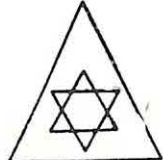
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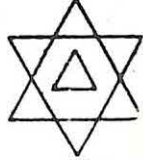
3



4



5



6

Part Three
Answers to the 15 Tests

TEST-ONE

1. MD. Doctor of Medicine.
Rest of them are gallantry awards.
2. Yezdi, which is a motor cycle.
Rest of them are cars.
Ambassador, Fiat, Standard, Hindustan.
3. Wallace, who was a thriller writer.
Rest of them are poets.
Homer, Tagore, Shelley, Keats.
4. Dev, who is an actor.
Rest of them are singers.
Kishore, Rafi, Mukesh, Talat.
5. Jalandhar.
6. The Random House Dictionary defines "Rider" as: (1) "A person who rides a horse or other animals, a cycle, etc. (2) Any object which is attached to something else. (3) An additional clause attached to a legislative bill in passing it." These are the three most common meanings.
7. 14.
The numbers in the series are being reduced by 1, 2, 3, 4 and so on, respectively.
8. 14.
The numbers outside the bracket are divided

by four and the results are kept in the bracket.

9. 6.

There are two series. One is going down by 3 and the other by 2, alternatively.

10. 37.

Each number is double of its preceding number, minus five.

11. 33.

Each number is decreasing by 16, 8, 4, 2 and so on.

12. 18.

Each number is double of its preceding number minus 10.

13. (a) 8 square miles.

(b) $2\frac{1}{2}$ square inches.

14. 18.

(3! = Factorial 3, i.e., $1 \times 2 \times 3$. In the same way $4! =$ Factorial 4, i.e., $1 \times 2 \times 3 \times 4$)

15. (a) 31 to 1

(b) 27 to 5

16. 67, 31, and 2.

If the sum of three prime numbers is even, one of them must be 2.

17. 6.

The figures in each line are decreasing in size.

18. 2.

Each line has a circle, a diamond, and a square. The diagonals are up, down, and/or sideways. The missing figure must, therefore,

be a diamond with its diagonals perpendicular to each other.

19. 3.

Each row has three types of faces and noses. The missing figure must, therefore, be square with a black nose and one black and one white eye.

20. 2.

In the first figure of the first row, circle is surrounded by a square, in the second figure square is surrounded by the circle. The bars, too, are reversed.

TEST-TWO

1. All of them have "AN" in them.
2. Commander.
Rest of them are Army ranks.
3. Field Marshall. General, Colonel, Major, Captain, and, Soldier.
4. Mamba, which is a snake.
Rest of them are dances.
5. Crochet (needle work).
Rest of the terms are connected with music.
6. Malayalam, which is a palindromic word.
That is, it is read the same forward and backward.
7. 17 feet.
8. 100 to 1.
9. 9 to 1.
10. The odds are 16 to 1 that you draw 2 cards

of one suit and one card each of the two other suits.

11. 154.

The numbers outside the bracket are added and doubled.

12. 35.

The numbers are increasing by 1, 2, 4, 8 and so on.

13. 18.

There are two alternating series. One going up by 4, the other by 3.

14. 86.

The numbers are double of their preceding number minus 1, 2, 3 and so on.

15. 24.

The series is increasing by 2, 3, 4, 5 and so on.

16. 80.

The numbers are decreasing by 33.

17. 1.

Each row has three figures (thin, round, and square). Feet are also thin round or triangular. The missing figure must, therefore be 1.

18. 5.

Figures in the third row are the same as those in the first row, only their shaded parts are reversed.

19. 2.

First Figure of the first row has one arrow

and two lines, first figure of the second row has two arrows and one line, and the first figure of the third row has one arrow and three lines. The same degree of progression is there for the second and third figures of each row.

20. 1.

First figures of all the three rows are different. So are the second figures. Hence, the missing figure must correspond to the similar differences.

TEST-THREE

1. Port.

Rest of them make another word when spelled backward. Evil, Rail, Brag, Pins.

2. Tabla.

All are musical instruments. But, except for tabla, all are wind instruments.

3. Ear.

F-ear, G-ear, P-ear, R-ear, W-ear.

4. Palestra, which is a gymnasium.

Rest of them are units of currency.

5. Stationary, which means not moving.

Rest of them are articles of stationery.

6. Kant.

Rest of them end with the same letter they begin with.

7. $1/7 = 142857$

$2/7 = 285714$

$3/7 = 428571$

8. 1023 to 1.

9. 12ft. \times 5ft. Diagonal = 13ft.

10. 8 years

11. 48.

The series consists of numbers which have differences which are double of the difference between the preceding two numbers.

12. 12.

Numbers are decreasing by 6.

13. 115/576.

The series consists of adding every factor with 1, 2, 3 and so on, and dividing the result by 1×1 , 1×2 , $1 \times 2 \times 3$ and so on. For example:
 $19/24 + 4 = 115/24 \div 24 (1 \times 2 \times 3 \times 4) = 115/576.$

14. 7/10.

There are two series. One consists of odd numbers and the other, even numbers. Both are increasing by 2.

15. 75.

The series consists of numbers which are doubled and increased by 1, 2, 3 and so on, respectively.

16. 7/13.

The numbers at the top are increasing by 2, 3, 4 and so on, respectively. Numbers at the bottom are double of the top numbers, minus one.

17. 1 and 6. 2 and 7, 3 and 5, 4 and 8.

18. 1.
From A to B and so on, the figures of the star, circle, square, and triangle are changing their places clockwise.
19. 2.
First and third figure in each row is a pair. So, 'I' must be identical to G.
20. 1.
Third figure in each row is looking up.

TEST-FOUR

1. Guiana.
Rest of them are in the USA.
2. Marquesas.
Rest of them were/are part of the British Empire.
3. Honduras.
Rest of them are islands.
4. Siam.
Rest of them are in India.
5. Merimba is a musical instrument.
6. Shelley, who was a poet.
Rest of them are painters.
7. 9 and 4.
8. 11 inches and 8 inches.
9. Sharma has 6 daughters.
Verma has 4 daughters. ($6/10 \times 5/9 \times 4/8 = 1/6$).
10. 6.

11. 33.

The series consists of numbers which are double of their preceding numbers, minus 1. For example, $17 \times 2 = 34 - 1 = 33$.

12. 5.

The numbers are decreasing by 5.

13. 6/S.

The numbers are increasing by 1, and the gap between the letter is determined by the numbers above.

14. 22.

The series consists of doubling the upper numbers and subtracting 1, 2, 3 and so on, respectively, to get the bottom numbers.

15. Z.

The gap between the letters is of 3, 4, 5 letters and so on, respectively.

16. 39.

The series consists of numbers which are doubled their preceding number, minus 1, 2, 3 and so on, respectively.

17. 3.

Each row has grinning, scowling, and grim faces. Grinning and scowling faces are looking at the right. Grim face is looking straight ahead.

18. 5.

Figure with right black eye has left side of its head shaded, left black eye has right side of the head shaded, and blank eyes have blank heads. So, the missing figure must, therefore, be 5.

19. 2.

Right eyed face has left diagonal, left eyed has right diagonal, and diagonaled face has no eyes at all. Each row has these three faces.

20. 4

Grinning faces have angry eyebrows, scowling faces have drooping eyebrows, and straight faces have straight eyebrows. Every row has these three kinds of faces.

TEST-FIVE

1. Peacock.

Rest of them are supposed to be the greatest enemies of the farmer.

2. Baroque, which is a architectural term.

Rest of them are musical terms.

3. Pessimism, which means looking always for gloomy side of things.

Rest of them are religions.

4. Huitzilopochtli, which was a Mexican god.

Rest of them Hindu gods.

5. Contract bridge.

Rest of the games are more than hundred years old.

6. Colgate.

Rest of them are named after some place.

Calico after Calicut, Muslin after Mosul, Nankeen after Nanking, and Port after Oporto.

7. CAD.
A=2, B=3, C=7, and D=9.
8. 8 inches and 7 inches.
9. 5—4—3—1.
10. 4—4—3—2.
11. 24.
The numbers are increasing by 4.
12. 45.
The series consists of numbers which are added 3, and doubled, alternatively. For example, $6+3=9$, and $9 \times 2=18$.
13. 24.
Each number is the square of 0, 1, 2, 3, and so on, respectively, minus 1.
14. 77.
The number in the bracket is half the difference between the numbers outside the bracket.
15. 52.
The number in the bracket is half the difference between the numbers outside the bracket.
16. 66.
Each number is double of its preceding number, minus two.
17. 5.
There are three kinds of faces in each row. Figures with left eye, shaded right face, and left head, right eye with left face and right head shaded, and figures with two eyes, mouth and plain heads.

18. 6.

There are three kinds of faces in each row. Faces with left side square, right side circle and a triangle between them, faces with left side circle, right side square and a triangle between them, and faces with two eye-circles and a square between them.

19. 4.

There are three kinds of figures in each row. Figures with a triangle in a square, figures with a square in a triangle, and figures with separate square and triangle.

20. 4.

Each row has three kinds of flags. Flags with their circle in the middle, right hand top, and left hand bottom.

TEST-SIX

1. Toscannini, who was a musician.
Rest of them were painters.
2. Field Marshall, General, Lieutenant General, Major General, Brigadier, Colonel, Lieutenant Colonel, Major, Captain, and Lieutenant.
3. Henry Ford, who was a motor car pioneer.
Rest of them were blind during part/or all of their lives.
4. Debentures, which are certificates for money lent to a company at a fixed rate of interest. This interest is the first charge upon the company.
Rest of them are not loans.

5. Hindi, which is one of the Modern Indian languages.
Rest of them are basic international languages.
6. Drum.
Rest of them are string instruments.
7. Whale, which is a mammal.
Rest of them are fishes.
8. Chamberlain, who was a politician.
Rest of them are poets.
9. Spider, which has eight legs.
Rest of them have six legs.
10. Sleigh, which slides.
Rest of them move on wheels.
11. 64.
The series consists of numbers which are cubes of 1, 2, 3 and so on.
12. 76.
The number inside the bracket is double the addition of the numbers outside the bracket.
13. 27.
The numbers in the bracket is the difference between the numbers outside the bracket.
14. 72 and 117.
There are two series. Each is three times its previous alternate number.
15. 25.
The number in the bracket is the addition of individual digit numbers outside the bracket.

16. 29.

There are two series. One starts from the second number and consists of numbers which are half of their preceding alternate number. The other is derived by subtracting 4 from the preceding alternate number and having the result.

17. 5.

Each row has three kinds of faces, with arrows diagonally opposite to each other, towards each other and vertically parallel to each other.

18. 3.

There are three kinds of faces in each row. Faces with uplifted, drooping, and flat mouths.

19. 3.

The combined number of arrows at A and B remains the same throughout, in each row. But the number of arrows at A increases and at B it decreases. So, the missing figure must, therefore, be 3.

20. 5.

In each row the number of figures in the circle increases by one, and each increase is enclosed by the original figure. That is, first figure in the first row has one triangle, in the second figure, the additional triangle is enclosed by the first one, and so on.

TEST-SEVEN

1. Fire, stone, weapons, boat, weaving, plough,

- iron, steam power, electricity, internal combustion engine, and radium.
2. Dogs, which are used for all the purposes mentioned.
 3. Hypocrisy, which means pretending to possess desirable attitudes, etc., but one actually does not possess.
 4. Chess.
Rest of them are gambling games.
 5. Black, which, when prefixed, will change the meaning of all the words. Black Art, Black Ball, Black Cap, Black Bird, Black Country, Black Diamond, Black Flag, Black Prince, Black Rod and Black Death,
 6. Cockpit, which is in aircrafts.
Rest of them belong to ships.
 7. August.
Rest of them have "R" in their names.
 8. Socrates, who was a philosopher.
Rest of them are composers.
 9. Rickshaw, which is a road vehicle.
Rest of them are boats.
 10. Porpoise
Rest of them are fishes.
 11. 36.
The second number is the result of 8×3 while the third number is the result of $8 \times 3 = 24 \div 2 = 12$. This treatment is repeated, alternatively.

12. 408.

The number in the bracket is double the difference between the numbers outside the bracket.

13. 15.

There are two series, one starting with 5 and the other with 6. Both go up by 2,3,4 and so on, respectively.

14. 219.

The number in the bracket is three times the difference between the number outside the bracket.

15. 21.

Each number is half of its preceding number, plus ten.

16. G.

Letters have a three letter gap between them.

17. 5.

Each row has three squares. First has one figure in it. Second has two. Third has the same two figures, but separatedly.

18. 4.

In each row, the row of blocks is decreasing by one.

19. 1.

In each row, the horizontal crosses lying outside/inside the circle change the positions in the other circles. The same goes for the vertical crosses.

20. 4.

In each row the third figure is derived by

putting the first figure in the second one.

TEST-EIGHT

1. All mean a "small river."
2. All mean "Mister."
3. All are/were magicians.
4. English, which is an international language.
Rest of them are Indian ones.
5. Odyssey, which was written by Homer.
Rest of them were written by Sophocles.
6. They are all of German origin.
7. Shakespeare, who was a dramatist.
Rest of them are painters.
8. About 3 miles.
9. 500 feet.
10. There are $24(2 \times 3 \times 4)$ arrangements possible for four letters. But in "ALAN" case, there are two As, and so two of these arrangements will spell ALAN. The chances are, then, 1 to 12 for 11 to 1 against.
11. 662.
The number in the bracket is double the addition of numbers outside the bracket.
12. 23
Each number in the series is derived by doubling its preceding number, minus 2,3,4, and so on, respectively.
13. 256.
Each number at the top is double of its

preceding number. Each number at the bottom is square of its preceding number.

14. 16.

The numbers are obtained by $+2, -3, +4$ to the numbers, and so on, respectively.

15. F.

Each letter has a gap of two other letters of the alphabet, calculated from backward.

16. 78.

Rest of the numbers are squares.

17. 5.

In each row, the third figure is derived by putting the second figure in the first.

18. 2.

In each row the number of arrowheads increases and arrowtails decreases. Their combined number, however, remains the same.

19. 3.

There are six kinds of figures: square, circle, triangle, star, semi-circle, and parallelogram. They are placed in a successive order on the upper and lower part of the diagonal. Square and circle in the first figure, circle and triangle in the other, and so on.

20. 2.

There are three kinds of figures (circle, triangle, and square) getting interlocked in a forward and backward order. In the first figure, circle is interlocked with triangle, in the second figure triangle is interlocked with square, in the third figures square is interlocked with circle, and so on.

TEST-NINE

1. All are connected with food.
A gourmet is a connoisseur in the arts of eating and drinking.
A gourmand likes a lot of good food.
A glutton is an extremely greedy person.
An epicure takes pleasure in food and drinking.
2. All are connected with the psychic phenomenon.
Poltergeist is a spirit which is supposed to move furniture, break crockeries, etc.
Medium is person through whom spirits communicate.
Planchete is a small board on wheel which writes when hands are rested on it.
Wraith is the apparition of a living person as a warning of death or disaster.
Doppelganger is a similar apparition, specially of oneself.
3. All mean "flag."
4. India.
Rest of them are in Europe.
5. Door.
Rest of them are dresses.
Sarong is a Malay dress.
Dirndl is a Central European dress.
Burnous is an Arabian dress.
Obi belongs to Japan.
6. Golden, when prefixed with the words, gives them special meaning. Golden Gate, Golden

Valley, Golden Rule, Golden Age, Golden Fleece.

7. At the South Pole.
8. UK (United Kingdom).
9. Cricket.
10. Crimean War, the only war in which England and France were allies.
11. 67.
Every number is double of its preceding number, plus 1, 2, 3, and so on, respectively.
12. 20.
The second number is equal to twice the preceding number, minus 4. The third number is equal to twice the preceding number, plus 4. This process is repeated alternatively
13. 1560.
The lower numbers are the square of three numbers divisible by 8 (24, 32, 40), from which 8, multiplied by the number at the top, is subtracted.
14. 63.
Each number is double of its preceding number, plus one.
15. T/M
There are two series. One starts with D and goes on to F and I. The other starting with K goes on to M and P. The difference between the letters in the alphabet is 1, 2, 3 and so on, respectively.

16. 75.

The series consists of numbers which are double their preceding number, with plus and minus one alternatively.

17. 2.

The first and third figure of each row is a repetition.

18. 4.

In each row the star is made by using the first two triangles.

19. 4.

In each row the shaded and blank balls are moving clockwise from left to right and anticlockwise from right to left.

20. 6.

In each row the numbered and blank portions are moving anticlockwise from left to right and vice versa from right to left.

TEST-TEN

1. In all these books, their authors tried to portray the perfect state.
2. D'Artagnan. Though all the four play prominent roles in Dumas' Three Musketeers, D'Artagnan was not really a musketeer.
3. Pallium, which is an ecclesiastical vestment. Rest of them are metals.
4. Hargreaves Spinning Jenny
James Watt Steam Engine
Stephenson Steam Locomotive

Gilchrist-Thomas	Abstraction of phosphorous from iron ore.
Henry Cort	Pudding Iron
Parsons	Turbine
Perkins	Aniline Dyes
Siemens	Open hearth furnace
Brindley	Canals
Abraham Darby	Coke for smelting

5. All were apostles of Christ.
6. All are gambling games and all are played without cards.
7. Manekshaw, the only Field Marshal.
8. Ramgoolam, the only foreigner (Mauritius)
9. All are constellations.
10. 2 is the Logarithm of 100.
11. M.
There is a gap of two letters between any two letters in the series.
12. 112.
The bottom numbers are derived in this way: the top number is squared. The square is divided by two, and the original number is subtracted from the result. For example.
 $14 \times 14 = 196 \div 2 = 98 - 14 = 84$.
13. J/T.
The upper letters have a gap of two letters, and the lower letters have a successive gap of 3,4,5 and so on.
14. 79.
The difference between the upper and lower

- numbers is 21, with the lower one being the greater.
15. 1296.
The numbers are square of their preceding alternate numbers.
16. 69.
Numbers are double of their preceding numbers with plus and minus 1, respectively.
17. 3.
In each row the figures of star, triangle, circle and square are moving anti-clockwise from left to right.
18. 2.
In each row the figures of circle, triangle, and square move clockwise from left to right, with the arrow pointing towards the opposite direction.
19. 4.
In each row, the third figure is the combination of the first two figures.
20. 2.
In each row the square and the ball are moving anti-clockwise.

TEST-ELEVEN

1. Cock.
Rest of them are various kinds of shells.
2. Peacock.
Rest of them are sea birds.
3. All were/are military leaders.

4. Churchill, who was a political leader.
Rest of them were military leaders.
5. All were military leaders.
6. All were military leaders.
7. Stretcher.
Rest of them move on wheels.
8. These were the four voyages made by Gulliver during his travels.
9. It is noon at Greenwich at these local times.
10. Flame of oxyacetylene burner (3000°C)
Flame of bunsen burner (1800°C)
White heat (1300°C)
A red hot body (526°C)
Boiling water (100°C)
The human body (37°C)
Melting point of ice (0°C)
The North Pole (-41°C)
Freezing point of alcohol (-114°C)
The absolute zero (-273°C)
11. $4/6$.
There are two series, going up and down.
One is decreasing by 1, and while it too, is increasing by 1, the other series is squared.
For example, $5^2, 4^2, 3^2$, and so on.
12. 131.
The series consists of numbers in which three times the difference between the first two is added to the second number to get the third number, and three times the difference between the second and third number is

subtracted from the third number to get the fourth number, and so on.

13. 211.

The number in the bracket is one third of the total of the numbers lying outside the bracket.

14. 5.

There are two alternating series. Each number is less by one, then its preceding alternate number.

15. 0/16.

There are two series. The difference between the numbers and the gap between the letters is increasing by 3,4,5 and so on.

16. 677.

The series consists of numbers which are square of their preceding number, plus one.

17. 3.

In each row, the balls are moving clockwise and the arrows anti-clockwise.

18. 2.

The figures in each row are increasing in size.

19. 6.

In each row, the first figure encloses the second figure, the second the third figure, and the third figure encloses the first figure.

20. 6.

Each row has three types of faces. The missing figure must, therefore, be a triangle with left eye black and the mouth lined.

TEST-TWELVE

1. All were military leaders.
2. All are names of different dishes.
3. All competed for the legendary Golden Apple of Discord.
4. All are ships of various kind.
5. All are islands.
6. All of them were written when their authors were in prison.
7. There can be many reasons.
There might be a decrease in his salary.
Cost of living might have risen.
There might be a higher taxation.
His family may have become larger.
8. Four.
9. They are all caps.
Sombrero is worn by the Mexican.
Fez is a Turkish cap.
Mitre is worn by the Bishops, etc.
Kepi is worn by French soldiers.
Feathers are usually worn by the Red Indian and the like.
10. There are many.
Anything to do with electricity.
Sewing Machine.
Typewriter.
Bicycle.
11. 75.
The number in the bracket is half of the product of the numbers outside the bracket.

12. 19/22.

There are two series. The difference between the number in each is increasing by 2,3,4 and so on. For example: 5,7,10, and so on, and 8, 10,13,17 and so on.

13. 322.

The number in the bracket is twice the difference between the numbers outside the bracket.

14. 78.

The number in the bracket is three times the addition of numbers outside the bracket.

15. 154.

The series consists of numbers whose difference increases by 2. For example:

$$-82+97=\underline{15}, -97+114=\underline{17} \text{ and so on.}$$

16. 4.

There are two alternating series. One goes up by 3, another goes down by 2.

17. 2.

Figures in the bottom row are same as those in the top row. Only their shaded portions differ.

18. 5.

Faces with triangular mouth are looking to the right, faces with the square mouth are looking to the left, and round mouth is looking up. Each row has faces of these three kinds.

19. 3.

Faces with cross-eyes has a scowling mouth, left-looking eyes have grinning mouth, and

grim mouths are looking below. Each row has these three kinds of faces.

20. 5.

Straight mouthed faces are cross-eyed, triangle mouthed faces are looking up and down, and square mouthed faces are looking right and left. Each row has these three kinds of faces.

TEST-THIRTEEN

1. All are names of volcanoes.
2. All are poets.
3. ROHB (Bohr Niels), who was a scientist.
Rest of them are Tennyson, Browning, Chaucer, and Coleridge.
4. USONHD (Hudson), who was an explorer.
Rest of them are Wells, Dickens, Scott, and Hardy.
5. DYHAR (Hardy), who was a novelist.
Rest of them are Emundson, Cartier, Jonsz, and Hudson.
6. OEPICRNCUS (Copernicus), who was an astronomer.
Rest of them are Dante, Eliot, Flecker, and Homer.
7. All are acts.
8. Minerva was the Roman Goddess of wisdom.
In fiction, owl is usually considered to be a bird, famous for its wisdom.
9. Yes, dog.
Cynosurus is the dog's tail grass, while cynolatry is dog worship.

10. They belong to the same genus *Equus*.
11. 16.
The number in the bracket is the result of the division of the numbers outside the bracket, multiplied by 2. For example: $88 \div 11 = 8 \times 2 = 16$.
12. 39.
Numbers outside the bracket are added and divided by three to get the number in the bracket. For example, $81 + 36 = 117 \div 3 = 39$.
13. 324.
Numbers outside the bracket are added and divided by three to get the number in the bracket. For example: $449 \times 523 = 972 \div 3 = 324$.
14. 168.
The numbers are three times their preceding number minus 12.
15. 55.
The difference between the numbers outside the bracket is multiplied by 11 to get the number in the bracket. ($42 - 38 = 4 \times 11 = 44$).
16. 238.
The series starts with 3^1 and goes on to 3^2 , 3^3 , 3^4 , and so on, minus 1, 2, 3, 4, and so on, respectively. ($3^1 = 3 - 1 = 2$, $3^2 = 9 - 2 = 7$, and so on).
17. 2.
Scowling faces are looking up, grinning ones are looking down and grim faces are looking straight ahead. The three are there in each row.

18. 4.
"O" mouths are looking up, laughing mouths are looking left, and scowling mouths are looking straight. Each row has faces of these three kinds.
19. 1.
Each row has a circle, a triangle and a square. Numbers and shaded portions are moving in an anti-clockwise direction.
20. 3.
Number of arrows equals the number of bars.

TEST-FOURTEEN

1. Zomart (Mozart), who was a musician.
Rest of them are Tasman, Columbus, Nimez and Megallon.
2. CERUHAC (Chaucer), who was a poet.
Rest of them are Michelangelo, Millet, Picasso, and Rapheal.
3. TLEOI (Eliot) who was a poet.
Rest of them are Bohr, Baird, Boyle, and Copernicus.
4. IEURC (Cuire), who was a scientist.
Rest of them are Keats, Longfellow, Wordsworth, and Milton.
5. MOERH (Homer), who was a poet.
Rest of them are Curie, Darwin, Davy, and Edision.
6. GNINBWOR (Browning), who was a poet.
Rest of them are Rembrandt, Renoir, Reynolds, and Reubens.

7. Both are hands at the game of Piquet.
8. At the North Pole.
9. Sphairistike was the original name for Lawn Tennis.
10. These are the names of three of the Cook Islands, situated in the South Pacific, which, since 1901, are parts of New Zealand.
11. 26.
There are two alternating series of numbers which are double their preceding number minus 2.
12. 10.
In each row, the fourth number is (1st no. + 2nd no.) - 3rd no.
13. 6.
The third number in each row = (1st no. + 2nd No) \div 2
14. 256.
The numbers in the series = 1st no. \times 2nd no. = 3rd no., 2nd no. \times 3rd no. = 4th no., 3rd no. \times 4th no. = 5th no., and so on.
15. 18/30.
The sequence of numbers at the top is: -1, +2, -3, and so on.
The sequence of numbers at the bottom is: +1, -2, +3, and so on.
16. 14 and 13.
Each alternating series is going up by 2.
17. 4.
In each row the star, square, triangle and circle are moving anti-clockwise.

18. 2.
Each row has 9 circles, 9 triangles and 9 squares.
19. 4.
In each row, the third figure is the combination of the first two figures.
20. 1.
The figure are moving in clock-wise, while the arrows are moving in the opposite direction.

TEST-FIFTEEN

1. ESATK (Keats), who was a poet.
Rest of them are Einstein, Faraday, Raman, and Fleming.
2. TONLIM (Milton), who was a poet.
Rest of them are Cezanne, Degas, Goya, and Vinci.
3. AASTMN (Tasman), who was an explorer.
Rest of them are Tchaikovsky, Mozart, Strauss, and Handel.
4. OBUMUSCL (Columbus), who was an explorer.
Rest of them are Sullivan, Schubert, Schuman, and Grieg.
5. ZIMNE (Nimez), who was an explorer.
Rest of them are Bach, Beethoven, Brahms, and Chopin.
6. ISHANGWTON (Washington), which is in the USA.
Rest of them are Tiruchirapalli, Jammu, Allahabad, and Nagpur.

7. Yes.

Charles Luwidge Dodgson was the real name of Lewis Carroll, who wrote 'Alice In Wonderland.' He was a mathematics teacher.

8. There are twenty four ($2 \times 3 \times 4$) arrangement possible of four letters. But in case of ALAN, there are two As, and so, two of these arrangements will spell ALAN. The chances are, therefore, 1 to 12 for or 11 to 1 against.

9. Mathematics gives us even chance for a coin to come down head or tail on each occasion. But, if a coin is coming down continuously heads 100 times, then there must be something wrong with the coin. It will come down head the 101st time also.

10. Bhangra, which is a folk dance.
Rest of them are classical dances.

11. 14.

Numbers are increasing by 3.

12. $1/2$.

13. 14.

The middle number in each row = 1st no. + 3rd no.

14. 21.

Numbers in each line add up to 45.

15. 4.

In each row the middle number = 1st no. - 3rd no.

3a.

16. The middle number in each row is = (1st no + 3rd no.) $\times 5$.

17. 5.

Without changing their order, the numbers in the figures in each row are moving anti-clockwise.

18. 6.

In each row, the numbered and blank portions of the figures are moving clockwise.

19. 2.

As per row, the numbered and shaded portions change their positions clockwise, continuously from one row to another.

20. 4.

In each row, the second figure encloses the first, and itself is enclosed by the figure at the first place, when placed at the third place.

□□□



151.2
RA1

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